

# The Mining Journal

## RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper and for Transmission Abroad]

No. 2328.—VOL. L.

London, Saturday, April 3, 1880.

WITH  
SUPPLEMENT.] { PRICE ..... SIXPENCE.  
PER ANNUM, BY POST, £1 4s.

MR. JAMES H. CROFTS, STOCK AND SHARE BROKER,  
AND MINING SHARE DEALER,  
No. 1, FINCH LANE, CORNHILL, LONDON, E.C.  
ESTABLISHED 1842.

BUSINESS transacted in all descriptions of MINING Stocks and Shares (British and Foreign), Consols, Banks, Bonds (Foreign and Colonial), Railways, Insurance, Assurance, Telegraph, Tramway, Shipping, Canal, Gas, Water, and Dock Shares, and all Miscellaneous Shares.

BUSINESS negotiated in Stocks and Shares not having a general market value.

Every Friday a general and reliable List issued (a copy of which will be forwarded regularly on application), containing closing prices of the week.

MINES INSPECTED.

BANKERS: CITY BANK, LONDON—SOUTH CORNWALL BANK, ST. AUSTELL.

SPECIAL DEALINGS in the following, or part:—

50 Almada, 12s. 50 Javali, 8s. 9d. 20 Ruby, £7 1/2. 20 Richmond, £14 1/2. 50 Killifirth, 20s. 20 Leadhills, £3 13s. 9d. 50 Roman Gravels, £10 5s. 50 Marke Valley, £1 17s. 50 S. Indian Gold, £1 18 9s. 50 Nouveau Monde, 39s. 10 Santa Barbara, £2 1/2. 50 So. Convarrow, £1 1/2. 50 N. Penstruthal, £1 16s. 20 South Darren, £3 1/2. 50 N. D'Erseby, 20s. 20 South Darren, £3 1/2. 50 N. Herodfoot, 12s. 6d. 25 Pandora, 17s. 6d. 50 S. E. Wynaud, £1 11 3s. 100 Port Nigel, £2. 100 S. Penstruthal, 14s. 50 Frontino, £2 7s. 6d. 100 Tankerville, 17s. 6d. 50 U. Van and Glyn, 18s. 50 Glenrock, £1 13s. 9d. 100 Port Phillip, 11s. 100 West Phoenix, £2 1/2. 50 Grogwynion, £3 10s. 50 Prince of Wales, 17s. 20 West Phoenix, £2 1/2. 50 Herodfoot, £4 1/2. 100 Parys Copper, 27s. 6d. 20 Wheal Crebor, £4 1/2. 25 Hinderton Down, 20s. 50 Pestarena, 7s.

RAILWAYS—SPECIAL BUSINESS.

FOREIGN BONDS—SPECIAL BUSINESS.

Fortnightly accounts opened on receipt of the usual cover.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

ESTABLISHED 1842.

MR. W. H. BUMPUS, STOCK AND SHARE BROKER,  
AND MINING SHARE DEALER,  
44, THREADNEEDLE STREET, LONDON, E.C.  
ESTABLISHED 1867.

BUSINESS transacted in STOCK EXCHANGE SECURITIES  
and MISCELLANEOUS SHARES of every description.

RAILWAYS, BANKS, FOREIGN and COLONIAL BONDS.

TRAMWAYS, TELEGRAPHHS, and all the LEADING INVESTMENTS.

Accounts opened for the Fortnightly Settlement

A List of Investments free on application.

Mr. BUMPUS has SPECIAL BUSINESS in the undermentioned:—

50 Aberlyn, 23s. 25 East Chiverton, 7s. 9d. 75 Pestarena, 7s. 9d. 50 Carnarvon, 23s. 15 East Van, 39s. 6d. 50 Parys Copper, 27s. 20 East Caradon, £3 1/2. 25 Panulicillo, £4 1/2. 50 Blue Hills, £4. 10 Froncog, £5 1/2. 60 Port Phillip, 10s. 6d. 40 Bedford United, 40 Flagstaff, £2 1/2. 30 Port Nigel. 50 Blue Tent, £2 1/2. 35 Frontino, £3 11s. 3d. 40 Pandora, 16s. 6d. 75 Bodridis. 100 Glenrock, 25s. 10 Ruby, £7 1/2. 50 Great Laxey, 5 Great Laxey, 15 Richmond, £14 1/2. 50 Glenrock (Gold), 39s 6d. 20 Roman Gravels, £10 5s. 50 Great Holway, 5 8. Condurrow, £11 1/2. 50 Hington, 19s. 6d. 50 South Indian, 39s. 6d. 50 Capo Copper, £39 5s. 20 Herodfoot, £4 1/2. 25 South Darren, £3 1/2. 15 Copiapo, £12 1/2. 60 Killifirth, 20s. 5 Tincroft, £20. 20 Devon Consols, £13 8s 9d. 40 Leadhills. 3 Van, £18 1/2. 40 Derwent, £3 5s. 20 Mellencar, £5 7s. 100 Wheat Jewell, 19s. 6d. 20 Maske Valley, 27s. 6d. 20 Wheal Sisters, £4 1/2. 100 Don Pedro, 22s. 6d. 40 New Pevor. 40 West Kitty. 5 East Pool, £35 1/2. 50 New Quebrada, £3 18s. 25 No. Herodfoot, 11s. 6d. 30 West Phoenix, £2 1/2. 75 East Roman Gravels. 20 Wheal Crebor, £4 1/2. 20 Eberhardt, £4 8s. 9d. 100 Nouveau Monde, 37s 6d. 50 Pen-yr-Osedd.

SPECIAL BUSINESS, at close prices, in the SHARES of all the principal HOME and FOREIGN MINES.

Mr. BUMPUS devotes special attention to these Securities, and is in a position to afford reliable information and advice to intending Investors and others.

The following Mines are particularly recommended:—

WHEAL GRENVILLE. WHEAL PEEVOR. WEST PEEVOR.

NEW PEEVOR. WHEAL SISTERS. WEST PHENIX.

PEN-YR-OSEDDE. DERWENT. SOUTH DARREN.

WILLIAM HENRY BUMPUS, SWORN BROKER.

OFFICES: 44, THREADNEEDLE STREET, LONDON, E.C.

ESTABLISHED 1867.

MR. JOHN POOLE, STOCK AND SHARE DEALER,

GRACECHURCH BUILDINGS,

Has special and reliable information regarding the following mines, and he recommends the immediate purchase of the shares at present prices:—

Polrose (Tin). East Crebor. Parys Corporation.

Prince of Wales. West Caradon. Morfa Du.

Wheal Crebor. South Penstruthal.

The prospects of these mines are excellent, and should the present price of metals be maintained a rise of 300 or 400 per cent. may be expected in the next few months.

J. P. has Special Business in each at the closest net prices of the day.

MR. J. ROSEWARNE, 3, COPTHALL BUILDINGS,

LONDON, E.C.

WEST DEVON GREAT CONSOLS strongly recommended at present price—

£2 1/2 to £2 1/2. The adjoining Mine (Devon Great Consols) rises from £1 to £300 per share, and the general opinion is that West Devons will have a great rise very speedily. For further particulars, apply at the above address.

WANTED TO BUY—

100 Bedford United. 100 East Crebor. 100 Prince of Wales.

15 Carn Brea. 100 Gawton. 10 So. Wheal Frances.

50 Devon Consols. 50 Hington Down. 50 Wheal Crebor.

CHARLES J. SIMS, MINE OWNER, STOCK AND SHARE DEALER, 2, DRAPER'S GARDENS, THROGMORTON STREET, LONDON, E.C.

(Late of Tavistock, Devon, the centre of the Devon Consols District.)

Special and reliable information and advice on the mines of Devon and Cornwall, and of the Llanwrst District.

Twenty-five years experience in Mining.

Special information on Manganese Mines at home and abroad.

All business entrusted to C. J. Sims will have careful and prompt attention.

MESSRS. J. GAPPER AND CO., PRACTICAL MINING

ENGINEERS, NO. 5, AUSTIN FRIARS, E.C.

ESTABLISHED 1842.

Messrs. G. and Co. strongly recommend the purchase of Shares in LADY

BERTHIA UNITED, BETTWS-Y-COED (Lead), and GLANDORE MINES for

a great rise in price during the present year.

MR. JOHN RISLEY, STOCK AND SHARE BROKER,

33, CORNHILL, LONDON E.C.

ESTABLISHED 1858.

BANKERS: LONDON AND WESTMINSTER, Lothbury.

POLROSE TIN SHARES.—This great property, situated near the Great Wheal

Vor and Great Work Mines, is in the centre of a group of tin lodes that have

given over two millions sterling in dividends; and, according to all reports, a large area of rich tin ground is in Polrose undeveloped, from which great riches

will be forthcoming during the present year.

WEST CARADON.—The riches of this mine are well known. Over £120,000

have been paid in dividends, and a large and most important section of the mine

is yet undeveloped. Operations have been commenced, which it is expected will

shortly lay open rich courses of ore, which can be worked without steam power.

This promises to be one of the greatest copper prizes of 1880, and shares should

be immediately secured while they can be had at the present low price.

J. R. specially and strongly recommends these mines for a rise of from 300 to

400 per cent. during the present year.

### STOCK AND SHARE MARKETS.

Prices of STOCKS and SHARES in RAILWAYS, BANKS, ENGLISH and FOREIGN GOVERNMENT SECURITIES, GAS, MINES, INSURANCE, and other Stock Exchange Securities, and various important information forwarded on application to—

MESSRS. PETER WATSON AND CO.,  
18, AUSTIN FRIARS,  
OLD BROAD STREET, LONDON, E.C.

BUYER and SELLER of SHARES at the close Market Price of the day.

BANKERS: THE ALLIANCE BANK (Limited).

MESSRS. PETER WATSON AND CO.'S  
BRITISH AND FOREIGN MONTHLY MINING NEWS  
—STOCK AND SHARE INVESTMENT NOTES—MINES,  
MINERALS, AND METAL MARKETS—SHARE LIST,  
No. 816, VOL. XV., for MARCH month, will be ready next  
week, and will be sent to customers on application.

Annual Subscription..... 5s. | Single Copy..... 6d.

MESSRS. PETER WATSON AND CO.,  
18, AUSTIN FRIARS, E.C.

MR. ALFRED E. COOKE,  
DEALER at NET PRICES in EVERY DESCRIPTION of STOCKS  
and SHARES,  
76, OLD BROAD STREET, LONDON.

ESTABLISHED 1853.

### IMPORTANT—THE ELECTORAL CRISIS.

Investors should now seek SOUND and UNBIASED OPINIONS, as pending the ELECTORAL CRISIS prices will probably fluctuate considerably.

### THE INVESTOR'S GAZETTE.

Applicants are informed that the next number will be issued on Friday, the 9th instant. Other investors desiring a copy must apply immediately.

### SPECIAL NOTICE.

Mr. COOKE's Offices adjoin both the Stock Exchange and Mining Market, but for the further convenience of clients they are now in telegraphic communication with the Stock Exchange.

### DAILY LIST OF PRICES ISSUED TO CLIENTS.

ALFRED E. COOKE,  
76, OLD BROAD STREET, LONDON.

(ESTABLISHED 1853)

Over 13 years at the above offices, adjoining the Stock Exchange and Mining Markets.

### STOCKS AND SHARES, FOREIGN BONDS, TELEGRAPHHS, TRAMWAYS, RAILWAYS, AND OTHER LEADING SECURITIES.

MR. JAMES STOCKER, STOCK BROKER,  
2, CROWN COURT, THREADNEEDLE STREET, LONDON, E.C.  
ESTABLISHED 1848.

### SPECIAL BUSINESS in the following:—

Almada Consols, 11s 6d. Flinstaff, £2 1/2. Ruby, 27. 50 Colorado, £2 1/2. 50 Condurrow, £11 1/2. 50 Chontales, 3s. 9d. 50 Gunnislake (Clitters). 50 South Darren, £3 3s. 9d. 50 Consolidated, 17s. 6d. 50 Frontino, 17s. 6d. 50 St. Penstruthal, 13s. 9d. 50 Herodfoot, 17s. 6d. 50 So. East Wynaud, off. w. 50 Devon Consols, £12 1/2. 50 Leadhills, 17s. 6d. 50 Morfa Du, 23s. 9d. 50 North Penstruthal, £1 1/2. 50 Tawkerelle, £5. 50 East Lovell, 37s. 6d. 50 East Caradon, £3 1/2. 50 Nouveau Monde, 38s. 3d. 50 Parys Corpora., 27s. 6d. 50 West Caradon, 45s. 50 Eberhardt, £4 6s. 3d. 50 Poitrose, £2 6s. 50 Emma, 12s. 50 Prince of Wales, 16s. 6d. 50 Pestarena, 5s. 9d. 50 Richmond, £14 1/2. 50 Wheal Pevor, £27 1/2.

### GOLD COAST MINING COMPANY.

IMPORTANT.—Mr. STOCKER has a limited number of SHARES FOR DISPOSAL at 5s. pm. Parties desirous of having an interest should immediately apply. Reports on application.

BANKERS: LONDON AND WESTMINSTER.

HORACE J. TAYLOR, STOCK AND SHARE DEALER,  
38, GREAT ST. HELEN'S, LONDON, E.C.  
(Late of the Port Phillip and Victoria Mining Companies.)

Business transacted at net prices in every description of Stocks and Shares.

### SPECIAL DEALINGS in the undermentioned:—

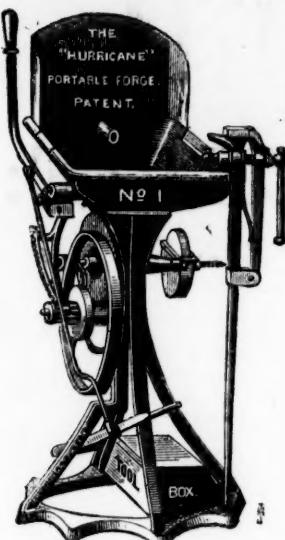
25 Almada & Trito. 10 Devon Great Consols. 250 Port Phillip. 100 Bedford United. 100 Eberhardt & Aurora. 100 Rossa Grande. 100 Bwth United. 25 East Caradon. 50 South Darren. 50 Consolidated. 50 Frontino. 75 So. India Gold. 100 Colorado. 100 Hington Down. 20 Tawkerelle. 75 Don Pedro. 25 Prince of Wales. 50 Victoria (London). 25 Derwent. 500 Pestarena. 20 Wheal Kitty. 25 Dolcoath. 15 Leadhills. 15 Roman Gravels. 10 Nou. Monde. 21 17s. 6d. 50 Pen-yr-Osedd. 100 Parys Corp., £1 7 6 17s. 6d. 50 Tamar.

VICTORIA (London) are strongly recommended for increased dividends, and should be purchased at the present low price.

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MESSRS. W. DUNN & CO., STOCK & SHARE DEALERS,  
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## A COMPLETE, PORTABLE, AND EFFICIENT SMITHY FOR £7 7s.



## THE "HURRICANE" PORTABLE FORGE

(HARDINGE'S PATENT).

A Complete and Portable Smithy, possessing a Powerful Blast, a Forge, a Hearth, a Vice, an Anvil, a Rivetter's Hearth,



a Brazier's Hearth, a Mine Ventilating Apparatus, a Tool Grinder (Emery), a Cutter, a Circular Saw and Bench, a Polishing Wheel, a Chuck, Two Drills, a Drill Rest, and a Tool Box.



## PATENTED IN EUROPE AND AMERICA.

The "HURRICANE" Patent Portable Forges possess advantages unobtainable with Forges of any other description. They command themselves to the world, not only as being complete and portable Smithies and mine and ship ventilators of the highest practical value, but also for the extreme ease with which they are worked, the simplicity and compactness of their construction, and the steady continuous blast, which speedily creates an unusually high degree of heat. The "Hurricane" Portable Forges are made in nine distinct sizes, embrace attachments which form a complete smithy, and are suitable for all purposes in all climates.

The Rivetter's Hearth is readily connected to the nozzle of the forge by means of a flexible tube, and can be used in any awkward position for keeping rivets hot and close to the work. The Brazier's Hearth is similarly worked, but is constructed with a nozzle on opposite sides for producing heat equally on both sides of the work, and is particularly adapted for brazing band saws, &c. Hand Blowers for all ventilating purposes, and for fixed blacksmiths' hearths, are made on a new principle.

The Lever Handle can be used at any angle, or taken off altogether, and the Treadle used instead. There is a Recovering Spring to raise the Handle or Treadle. This arrangement secures all the easy motion of the old-fashioned bellows, is worked with much less effort than the Rotary Hand Wheel, and there are no Leather Bands to be burnt, no Cranks, and consequently no "Dead Centres." Three larger sizes than those given below are kept in stock.

## A 1-INCH BAR OF IRON CAN BE RAISED TO A WELDING HEAT IN TWO-AND-A-HALF MINUTES.

## PRICES.

No. 0.—THE AMATEURS', JEWELLERS', OR DENTISTS' FORGE AND WORKSHOP, 3 ft. by 1 ft. 6 in., and 2 ft. 8 in. high, fitted as a complete Smithy, including Forge, 6-in. patent Fan Blast, Hearth, Parallel, Vice with Anvil, Emery Wheel, Chuck, 2 Drills, a Cutter, Polishing Wheel, Crucible and Tongs, Ladle, Spanners, Drawers, Treadle and Flexible Band, Automatic Clutch, &c., &c. Weight, 84 lbs. Muffler, for conveying the smoke to chimney, 15s. extra.....	£8 8s. 0d.
No. 1.—FORGE, HEARTH (lined with fire-brick), and PAN 18 in. square, 2 ft. 7 in. high. Weight 132 lbs., with 8-in. patent Fan Blast, Spanners, and Emery Tool Grinder, complete, on standard.....	£5 15s. 0d.
No. 2.—DITTO DITTO. Weight, 156 lbs. Fitted with 2½-in. Vice with Anvil, 4-in. Emery Wheel or Grindstone, Chuck, Cutter, and two Drills, a Buffing Wheel or Polisher, Spanner, Tool Chest, Lock and Key, &c. Lever and Treadle. Muffler, 15s. extra.....	£7 7s. 0d.
No. 3.—FORGE AND HEARTH, 26 in. by 34 in. Weight, 160 lbs.: 10-in. patent Fan Blast, Spanners, and 5-in. Emery Wheel, complete on frame with four legs and two travelling wheels. Lever and Treadle.....	£8 8s. 0d.
No. 4.—DITTO DITTO. Weight, 184 lbs. Fitted with Two Travelling Wheels, 5-in. Circular Saw and Bench, and all the attachments of No. 2 Forge, but increased in suitable proportions. Hood, 21s. extra. Muffler, 35s. extra.....	£10 10s. 0d.
No. 5.—FORGE AND HEARTH, 30 in. by 42 in. Weight, 250 lbs. With 12-in. patent Fan Blast, Spanners, and 6-in. Emery Wheel, complete on frame with four legs. Fitted with Lever Treadle, Two Travelling Wheels, and Fast and Loose Pulleys for power.....	£12 12s. 0d.
No. 6.—DITTO DITTO. Weight, 280 lbs. Fitted with all the attachments of Nos. 2 and 4 Forges, but proportionately increased in size. Hood, 30s. extra. Muffler, 42s. extra.....	£15 15s. 0d.

Rivetter's Hearths, 15 in. by 15 in., 21s. Brazier's Hearths, 15 in. by 15 in., 27s. 6d. Union and Sockets for 1½-in. tube, 12s. 6d. Flexible Tubing, 1½-in., 1s. 6d. per foot.

PORTABLE FORGES.—By far the most comprehensive and complete arrangement we have ever seen for its purpose is the "Hurricane" Forge. It would appear that the inventor and patentee had foreseen and provided for every contingency which could possibly arise in connection with smithy work in this *multum in parvo* forge. In small compass, and at small cost, the contractor, engineer, boiler-maker, ironmonger, gasfitter, and many other employers of labour have in it an invaluable assistant, whilst to Colonists its companionship is indispensable. We predict for the "Hurricane" Forge unlimited success.

For Drawings, Prices of Larger Sizes, Trade and Export Terms, Testimonials, Agencies, and Licenses to Manufacture apply to—

THE "HURRICANE" PORTABLE FORGE CO.,  
28, NEW BRIDGE STREET, LUDGATE HILL, LONDON, E.C.

BICKFORD'S PATENT  
FOR CONVEYING  
CHARGE NSAFETY FUSE  
FIRE TO THE  
BLASTING ROCKS, &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1852 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH, AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN STREET, LIVERPOOL; and 85, GRACECHURCH STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES OF SAFETY FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL OF FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH THE COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

WEST OF ENGLAND GUNPOWDER COMPANY,  
SOLE MANUFACTURERS OF THE  
SAMPSON AND LANYON SPORTING GUNPOWDER.  
MR. LANYON, Manager.  
London Offices: St. Michael's House, Cornhill, E.C.

BENNETT'S SAFETY FUSE WORKS,  
ROSKEAR, CAMBORNE, CORNWALL.

BLASTING FUSE FOR MINING AND ENGINEERING PURPOSES

Suitable for Wet or Dry Ground, and effective in Tropical or Polar Climates.

W. BENNETT, having had many years' experience as Chief Engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices. Price Lists and Sample Cards may be had on application at the above address.

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THE SANDYCROFT FOUNDRY AND ENGINE WORKS COMPANY (LIMITED).

NEAR CHESTER  
Late the MOLD FOUNDRY COMPANY. Established 1838.

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CORNISH PUMPING, WINDING, AND EVERY OTHER DESCRIPTI

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PITWORK, BOILERS, FORGINGS,

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MACHINERY,

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SPECIAL ATTENTION given to MACHINERY for FOREIGN MINES.

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THE NEWCASTLE DAILY CHRONICLE  
(ESTABLISHED 1764).

THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER,

Offices, Westgate-road, Newcastle-upon-Tyne; 50, Howard-street, North Shields; 195, High-street, Sunderland.

## STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM.

## SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.

No. 2 size, 9 in. single cylinder, 2 ft. 6 in. drums.

A.—6 in. double cylinder, with 2 ft. 3 in. drums.

B.—8 in. " " 3 ft. 0 in. drums.

C.—10 in. " " 3 ft. 6 in. drums.

D.—12 in. " " 4 ft. 6 in. drums.

E.—14 in. " " 5 ft. 0 in. drums.

MANUFACTURED BY

THE USKSIDE CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING MACHINERY, AND FORGINGS OF EVERY DESCRIPTION.

NEWPORT, MON.

Agents for the six Northern Counties—

TANGYE BROTHERS, ST. NICHOLAS BUILDINGS,

NEWCASTLE-ON-TYNE.

[This Advertisement appears fortnightly.]

WILLIAM EDWARDS AND SON,  
Griffin Works, Wolverhampton,

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Edge Tools, Spades and Shovels. Hand, Sledge, Stone Quarry, and Mining Hammers, Railway Contractors' and Mining Tools. Axes, Adzes, Pickaxes, Crow and Boring Bars, Wrought-iron Wheelbarrows.

The Original and Only Manufacturers of Best Crown Quality of Horse Shoes  
PATENTEES and MANUFACTURERS of PATENT PUNCHED EYE PICKAXES, HOES, HAMMERS ADZES, and other TOOLS  
Under Patent No 4698.

## "TANNIC GELATINE,"

For REMOVING and PREVENTING INCRUSTATION of every description of STEAM BOILERS (also CORROSION).

MANUFACTURED ONLY BY

WILLIAM RICHARDSON,  
GAS AND HYDRAULIC ENGINEER,

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By a special method of preparation this leather is made solid, perfectly close in texture and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

HEPBURN AND GALE,

TANNERS AND CURRIERS,

LEATHER MILL BAND AND HOSE PIPE MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON.

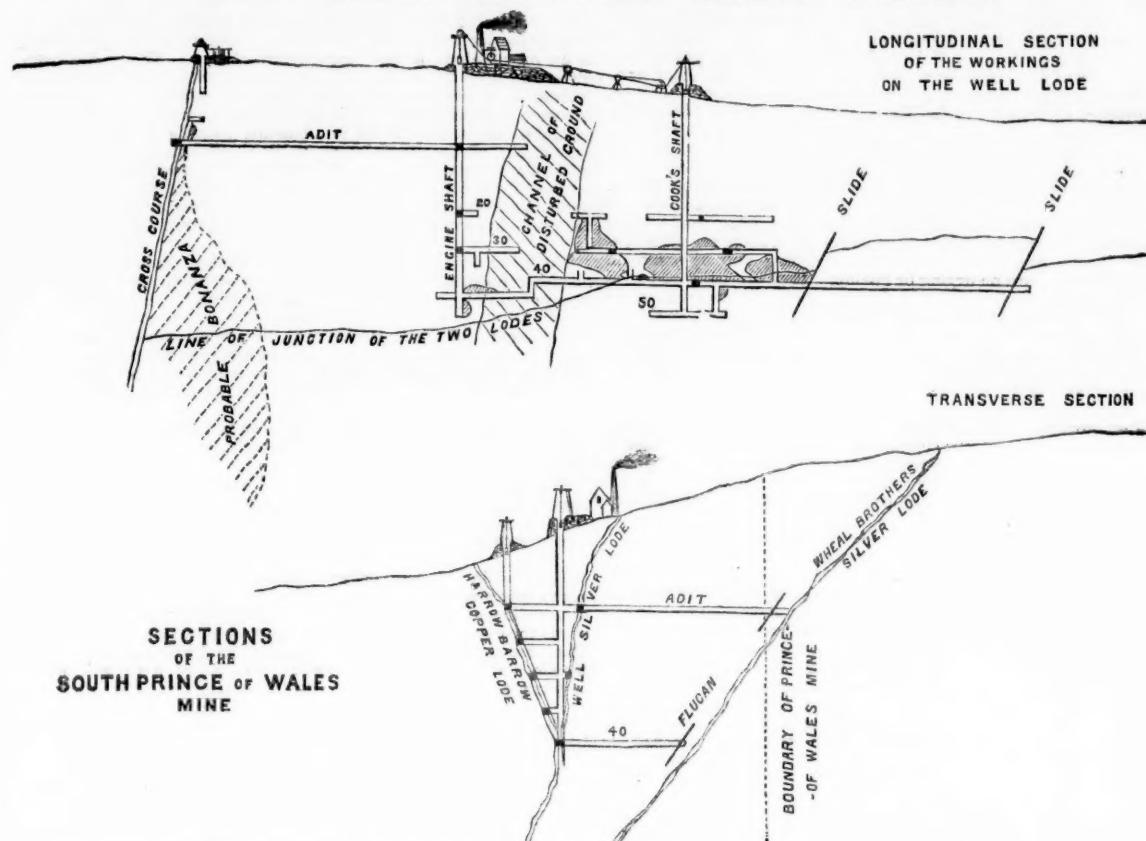
Prize Medals, 1851, 1855, 1862, for

MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.



THE LIST OF APPLICATIONS FOR SHARES AT PAR WILL CLOSE ON APRIL 5.

## SILVER MINING ENTERPRISE IN CORNWALL—THE SOUTH PRINCE OF WALES MINING COMPANY.



A BONA-FIDE MINING INVESTMENT AT PAR, WITH A CERTAIN PROSPECT OF LARGE DIVIDENDS, AND OF THE SHARES RISING TO A HIGH PREMIUM.

ISSUE OF 5000 SHARES OF £1 EACH,

IN THE

SOUTH PRINCE OF WALES MINE  
(SITUATE AT HARROWBARROW, NEAR CALSTOCK, CORNWALL.)

The accompanying illustrations will show that this mine consists of three lodes, which all form a junction in depth, and which towards the west are intersected by a cross-course. The most southerly of these lodes has proved very productive for copper and arsenic, while both of the others are true silver lodes. One of the latter is the famous Wheal Brothers lode, which above the adit level yielded large quantities of rich silver ore in the Wheal Brothers, Prince of Wales, and Queen Mines, the last mentioned being now included in the South Prince of Wales. The other is known as the Well lode, and is a continuation of the vein which in the Wheal Mexico, East Cornwall, and Wheal Langford Mines, to the west, contained the richest deposit of silver ever worked in the United Kingdom. In March, 1877, Cook's shaft was sunk on the underlie of the Harrowbarrow lode to where a junction occurred with the Well lode, and a bunch of silver was cut, which yielded upwards of 10,000 oz. to the company then working the mine. This bunch is shown in the shaded parts of the longitudinal section, and will be seen to correspond with the line of junction of the lodes. It was "cut out" on the east by a "head" or "slide" in the country rock, and on the west by a singular disturbance of the ground producing a warp in the lode for some considerable distance. The sudden falling-off in the returns had not been foreseen, and, the company being heavily in debt, a voluntary liquidation was resolved upon. It was, however, arranged by some of the principal shareholders at Birmingham to resume exploratory work at once, and this they have done during the past nine months, with results that have led to the formation of the present company, which, as the following remarks will prove, is on the very eve of becoming one of the greatest mining prizes of the day.

1.—A cross-cut has been driven north in the silver-bearing run of ground to intersect the Wheal Brothers lode at about 70 fms. from surface. In this cross-cut a bonanza branch has just been cut, similar to one that occurs about 3 fms. south of the lode in the adit cross-cut. A few fathoms more driving must, therefore, reach the Wheal Brothers lode, and, in all probability, a large bunch of silver. The ground in the breast of the cross-cut is a beautiful buff-coloured killas, precisely similar to that which produced the silver in the Well lode.

2.—The 40 fm. level has been extended east of Cook's shaft through the hard ground encountered after the slide that cut out the silver, and has just passed another slide, the effect of which is that the lode has suddenly resumed a character highly congenial for silver. It seems that the line of junction is heaved upwards between the two slides, and that a further rich deposit must be standing so near the present end that a fathom or two of driving or rising will discover it.

3.—The western ends of both the 20 and 50 fm. levels at Cook's shaft are rapidly improving, and in the former some splendid copper ore, making a good produce for silver, is now in sight, and a small pile of about 5 cwt. has been already broken. This is a similar indication to what was met with in the level below, just in advance of a spot so rich that 1000 oz. worth of silver was cut in 24 hours.

3.—In about 2 fms. more sinking the engine-shaft will reach the junction of the Harrowbarrow and Well lodes, and in the side of the shaft, close to the present bottom, flakes of black silver so rich as to be malleable are already occurring in the joints of the rock.

5.—The adit level has been driven west to the cross-course, where a small bunch of silver ore has been met with. In this bunch some beautiful specimens of native silver have been found, an indication which in the Wheal Brothers lode was a certain precursor of large deposits of ore. The present discovery appears, however, to be on a side branch of the lode, the main body of which is considered to be standing to the north. A cross-cut has accordingly been commenced, and will doubtless cut the lode and a large mass of silver ore almost immediately.

6.—The shallow adit on the Harrowbarrow copper lode was some years ago extended west to the cross-course, and the copper ore taken away at this point was enriched up to 20 oz. of silver per ton. It follows as a matter of the highest probability that when the engine-shaft shall be sunk to the junction of the Harrowbarrow and Well lodes, and a level driven along the junction to the cross-course, a bonanza will be discovered of vast richness, extending from the adit right down to where the Wheal Brothers lode shall at length fall in and join the other two.

Whilst, however, so much stress is laid on the prospects of rich discoveries, it must not be forgotten that the ground already laid open is for hundreds of fathoms capable of being worked to a profit. The lodes are all more or less impregnated with silver in a form susceptible of concentration by jiggling and dressing. This has for some months past been proved by setting the work on tribute, and it is found that men will return the silver at an average of 13s. in £, so that the mine makes a profit of about one-third. Upwards of 400 tons have thus been treated, and the existing reserves of ore fit for concentration are estimated to produce about 30,000 oz. of silver, of which, therefore, about 10,000 oz. will be available for dividends.

It should be added that the mine is very cheaply worked, the total expenses for pumping and hauling being only about 20s. per month.

Furthermore, the company acquires the mine at prime cost, without any loading for vendors' profits or promotion money. It buys from the mortgagees of the old company for 2000s., including the full equipment of plant and machinery, and this purchase-money is payable in 1881, a rent at the rate of 200s. being paid meanwhile.

In view of the considerable premium at which the shares of the neighbouring Prince of Wales Mine are now standing—solely (and quite justifiably) on the prospect of discoveries being made—the list of applications at par for South Prince of Wales shares will be closed on April 5, and as it is anticipated that more than the total number available will be applied for, the allotments will be made in accordance with the priority of application.

Everything that is here stated is open to the strictest investigation. Specimens of the ore may be seen at the Geological Museum in Jermyn-street, and at the offices of the company's London agents, Messrs. Stuart and Co., 143, Cannon-street, E.C., where plans of the mine may be inspected. Reference is also made to the appended reports from eminent authorities.

The directors of the company are—Edward Charles Swinden, Esq., 123, Golden Hill-road, Birmingham; John Frederick William Penny, Esq., 115, Coventry-road, Birmingham; G. S. Dowling, Esq., 14, Temple-street, Birmingham; R. Lachlan Bogue, Esq., 17, Oxford-street, Liverpool; and J. Harrison Peel, Esq., 67, Leadenhall-street, London, E.C.; and the registered office is at 14, Temple-street, Birmingham.

The applications for shares may be made by letter, and need not be accompanied by any deposit, and may be sent either to the secretary, Mr. J. Nesbitt Dowling, at the Birmingham office, or to Messrs. Stuart and Co., 143, Cannon-street, E.C.

The full amount of the shares (1s. each) will be payable on allotment, after which there will be no further liability.

## LIST OF PARCELS OF SILVER ORE CUT FROM THE WELL LODE IN THREE MONTHS OF 1878, AND SOLD THROUGH MESSRS. JOHNSON, MATTHEY, AND CO.:-

Net dry weight. Tons cwt. qrs. lbs.	No. of ounces of fine silver per ton.	Price per ton £1716 18 0 realised.	1716 18 0	
			7143	2284
0 4 1 14 1/2	7143	£1716 18 0	495	0 0
0 3 0 10	2284	495	0 0	
0 3 0 10	1828	410	0 0	
0 7 3 6	1828	368	1 0	
1 5 0 25	1617	320	0 0	
1 5 0 12	1447	307	7 6	
0 6 1 16	1356	290	0 0	
1 1 3 11	1302	222	7 0	
1 1 3 11	1035	58	13 8	
10 18 0 0	285	45	6 6	
2 13 3 14	249	36	15 6	
9 13 3 14	195	29	10 9	
1 14 2 0	178	26	15 4	
2 13 1 0	165	24	10 5	
1 5 2 10	157	25	4 6	
6 19 0 9	145	26	12 6	
2 12 0 14	141	28	16 6	
11 14 2 21	133	12	0 10	
2 13 3 2	91	9	19 0	
3 13 2 14	88 1/2			
62 3 1 6 1/2				

\* \* \* In contrast to the above, it should be borne in mind that the average value of the ores produced from the Comstock lode is only about 12s. per ton.

## APPENDIX.

Extracts from vol. viii. of the Transactions of the Royal Geological Society of Cornwall:—

"After this the mine remained many years unwrought; but in 1833 it was reopened under the name of Wheal Brothers."—De la Beche, Report, p. 613, Cornish Geol. Trans., v. p. 140, table 21.

"Portions of argilliferous earthy brown iron ore (silver gossan) left by the former adventurers in shallow parts of the mine were now extracted and sold for between 150s. and 200s. per ton. So greatly does the ore differ in quality that some parcels of it brought no more than 2s., and others containing 0 50976 their weight of silver (= 1959 oz. per ton), as much as 500s. per ton in the market."—Captain Knott, MSS.

"At the 30 fm. level masses of native silver weighing many pounds each occurred in a part of the lode which was worth from 500s. to 600s. per fathom. But great part of the ore when brought to the surface contained only from (8 to 10 oz.) 0 000245 to 0 000306 its weight, although when (dressed) prepared for sale it yielded (60 oz. per ton of ore) 0 001836 its weight of silver."—Percival Norton Johnson, Esq., F.R.S., F.G.S.

"Wheal Sisters, opened also in 1833, on an eastern part of the same lode, afforded ore which, resembling for the most part that of Wheal Brothers, containing from 0 00 459 (= 150 oz. per ton) to 0 07 344 (2400 oz. per ton) its weight of silver. Portions of it were, however, mixed with from 0 15 to 0 2 their weight of lead. Small quantities of the silver ore were sold at 20s. per lb., and some parcels found a market at from 400s. to 500s. per ton, but the ordinary price was between 30s. and 50s."—Capt. Knott, an agent of the mine, MSS.

"The East Cornwall Mine was opened a third time, in 1848, under the name of Wheal Langford. For several years the ore afforded from 0 001 224 (= 40 oz. per ton) to 0 060 466 (= 1975 oz. per ton) its weight of silver, and its price ranged between 10s. and 550s. per ton. In June, 1855, 2 tons 6 cwt. 2 qrs. 6 lbs. (gold at 50s. per ton), realised 1184s. 15s. 9d."—Capt. Knott, an agent of the mine, MSS.

"Wheal Mexico, wrought to an inconsiderable depth on an eastern part of the same lode during 1847-8, afforded the chloride of silver, largely mixed with silty clay, granular quartz, and the carbonate of iron. Some portions of the ore contained 0 001 224 (= 40 oz. per ton), 0 026 318 (= 859 oz. per ton), their weight of silver. The prices generally ranged from 5s. to 200s. per ton, but small quantities free from impurities were sold at 2s. 10s. per (avordupois) pound."—Capt. Knott, manager of the mine, MSS.

"The total output of silver during the period comprised in the above extracts we have been unable to ascertain; but, as we find it publicly stated that one of the mines in question (Wheal Langford) yielded a profit of upwards of 90,000s. in two years, it is clear that the total production was very large.

Extracts from a lecture delivered at the Plymouth meeting of the

British Association in 1877, by Prof. Warington W. Smyth, F.R.S., the Chief Mineral Inspector for the Crown and the Duchy of Cornwall:—

"On the west of Dartmoor we appear to leap at once into a crowd of nearly parallel lodes, which continue with but little interruption to a mile beyond the granite protrusions of Hingston Down and Kit Hill. And as a proof of the vast importance of the lines in which I hope to interest you, and which on the ordinary map look so short and meaningless, I would crave permission for a few minutes to employ, as it were, a larger scale, and to glance at a single example of the social and commercial aspect of the study. A small patch of ground on the west of Tavistock (and on the skirts of Hingston Down), showing one of these lode-lines of three miles in length, is the scene of the working of the Devon Great Consols Mines. Here the operations, begun only in 1844, have yielded up to April last a total amount of 3,228,426s., and the clear profit to the shareholders has been 1,192,960s. Employing from 600 to 1000 men, the excavations in the solid rock have amounted in shafts and in winzes to upwards of nine miles in length, in galleries or levels to more than 30 miles. At Harrowbarrow (on the southern slope of Hingston Down) at the present moment a northern lode (the Well lode) is a flockan exhibiting such a course of ruby silver ore (pyrargyrite), with its faithful accompaniment of chalybite, as to be worth hundreds of pounds for every fathom."

## Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES \*—No. CXLVII.

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## SURFACE MINING.

From the last few lectures the reader will have perceived that many of the operations we have described might, perhaps, be considered rather as surface than underground operations. Indeed many cases occur where surface mining is found to be the best preliminary to later deep or underground working. From this point of view surface mining operations may be divided into two broad classes. First those which are evidently purely surface operations, generally carried on in deposits of no great thickness, and lying uncovered, or if covered with only a very thin overburden. Secondly, those operations which attain a great depth, and may, therefore, be called deep surface workings. These are usually carried on in deposits which are of considerable thickness, and which may be covered with a greater or less amount of overburden.

When a deposit is covered by a superposed layer of alluvium, or other strata, the first question which occurs as to the mode in which it shall be worked is whether some modification of surface or underground mining shall be adopted. The advantages of surface operations are:—1. That the deposit can be completely exhausted.—2. The expense of timber and other material for keeping open roads and levels is avoided.—3. The oversight is much easier, both as regards the workmen and also as regards the nature and carrying on of the operations. On the other hand a great amount of material must be removed besides the mineral actually worked. This is the chief consideration which determines the adoption of surface or underground workings, the relative thickness, and therefore amount, of overburden which must be removed for a ton of the useful deposit.

The laws respecting open workings are quite distinct from those of underground mining, and in some cases it may be of more advantage to the owner of the mineral to have it classed under one category or the other than to those working the minerals. In this country it has often been considered that mines or underground workings are those which require to be carried on by artificial light, and those are open workings for which daylight suffices.

In what we have called deep surface workings the mode of occurrence of the deposit will be of decisive importance in fixing upon one or other of the various modes of surface mining. When the deposit lies comparatively flat it will be opened out by removing the overburden where it is thinnest, and then going down to the bottom of the deposit by overstepping. When the deposit lies at a considerable angle it will be best opened out at the outcrop, forming an ordinary quarry. Even in this last case if the deposit is very thick, and there is any amount of overburden, it will be found most advantageous to adopt the method of understepping, and the workings will as they advance resemble more those of an immense lode open to the surface, which is being worked by understepping. When the deposit is not very much inclined, and the workings cannot be commenced at the outcrop, it will be necessary to chose such a place for the commencement as allows of ample room for heaping the overburden as the deposit is uncapped. As in almost all cases water may be expected to be met with, it is generally advisable to choose the deepest portion of the deposit to commence with, as by fixing a pumping engine at this point the workings can readily be drained. When the workings are near a hill side the water may be carried off by an adit. When this is impossible pumping shaft may be timbered in the overburden as it is tipped back into the open space left vacant by the removal of the deposit, and the shaft may likewise be connected with the face of the workings by a level timbered through the waste. In other cases it may be found best to sink the pumping shaft in ground which is to remain undisturbed, and to convey the water from the face of the workings to the bottom of the shaft along a level timbered either in the replaced overburden or in unbroken ground. In most cases the best and simplest arrangement is that where the shaft is at once built up in timber, in the first excavation made to the bottom of the deposit, a timbered level covered with lagging boards being carried from the bottom of the shaft to the faces of the workings. As soon as the faces have advanced far enough the overburden as it is removed is tipped over and around the level and the shaft. This shaft is sometimes used as a winding shaft.

In stirring the waste and overburden care should be taken that the heaps are made in places from which they will not have to be removed in the course of a subsequent working. There is generally a clause in the lease to the effect that the waste shall be put back in the old place, and the surface soiled and dressed for agricultural purposes. In this case such a plan of working must be adopted that the working faces are at one end of the workings and the waste heaps at the other, so that as the works advance the waste is carried back, and deposited at once in its permanent resting place.

The object of working the deposits in a stepwise fashion (understepping) is to avoid vertical walls of any great height, as the material of which the deposit, and more especially the overburden, is composed is generally not of a character to stand for great heights without support. Whether the total depth is slight or great high faces are in themselves very inconvenient to work for most materials. Another reason for the use of understepping, especially in the working of slate quarries and the like, is that advantage may be taken more readily of the jointage and bedding of the deposit; and in such deposits the fall of the material from high faces results in breaking an otherwise valuable material into worthless fragments, besides bringing the material to an unnecessarily low level,

run off on side rails to be tipped. When the workings have advanced some distance, so that the overburden has attained a thickness of 30 to 40 ft., a stepwise arrangement, with stope about 5 yards high, is adopted for removing the overburden. The waste is often tipped to a greater height than the original surface, so that the whole of the overburden can be tipped as the workings advance.

In many cases it is found advantageous to prosecute the removal of the overburden and of the deposit not simultaneously, but during special seasons of the year. The overburden is then removed during spring and autumn, whilst the deposit is worked during summer and winter, since during the winter the surface is often frozen and is always harder to remove than at any other time of the year. In the summer it will be found much cooler for the workmen in the lower part of the quarry than at the surface, besides that at this portion of the year less water will be met with at the bottom of the quarry.

As a last example, and as one of the simplest of mining surface operations, that of the winning of turf may be cited. The chief difference caused in the mode of getting turf arises from the possibility or otherwise of draining the surface. When this cannot be done, and the turf lies for the most part under water, it must be fished out with a sack-like apparatus. The turf is then formed into rectangular blocks, and afterwards spread out to dry. When the peat can be drained this is generally done, at least to a greater depth than it is intended to remove. The turf is cut in rectangular blocks, laid out and turned over in the sun to dry. When the turf is thick the upper 4 to 6 in. are first removed and dried, and the next layer is removed after the fresh surface has been exposed sufficiently long to become dry; so that after lifting out with the spade it simply requires to be turned over to dry on the other side. According to the size of the peat field, and the thickness of the peat, it may be arranged to be worked in steps, the one following the other, so that it is not left long after being dried on the upper side before it is turned over. The working away of each layer proceeds in a step-like arrangement, the first cut taking a width of 8 to 12 in., which is turned over and thrown back sufficiently far that it has dried sufficiently to be removed before the other portion of the peat on which it rests is removed. Three or four persons may follow each other, turning over a width of 8 to 10 in., so that each must set his turf blocks 30 to 40 in. back from the edge, not to be in the way of the following turf getter. The turf is often covered with earth, &c., which must be removed; it is advisable, however, not to uncover and drain more peat than can be prepared and removed during the summer season, since turf when once frozen becomes brittle and unfit for forming into blocks. Sometimes it is intended that the peat shall grow again, when the drainage arrangements are blocked up after the intended portion has been removed, since the peat requires to be under water to grow properly.

#### THE COAL PLANTS.

Mr. B. HOLGATE, F.G.S., read a highly interesting paper to the Yorkshire College Students' Association, at Leeds, on Tuesday, "On Coal Plants." Prof. GREEN, M.A., who occupied the chair, remarked that it was a common error to suppose that coal was only found in beds belonging to what was known as the carboniferous period. Such was not the case, for beds of coal were found in formations of all ages. Wherever and whenever the necessary climatical conditions existed the formation of coal followed. This we may say has been shown by the large quantities of coal that lie concealed beneath Permian, Triassic, and even Liassic strata beyond the margins of the known or visible coal fields. In fact, the question of the existence of coal under the cretaceous and other formations of the South of England is one that as yet not been determined. Mr. Holgate commenced by stating that our knowledge of the fossil plants of the coal measures was far from complete. This was mainly due to the fact that the majority of the specimens found were but imperfectly preserved. The leaf scars in the stems could be distinctly recognised, but the structure could not be traced. Fragments of petrified wood were found by concretionary action in the shales separating the beds of coal, and large quantities of resinous spores were found in many coals, some of which, especially the large flaming coals, were mainly made up of spores. The vegetation of the present day was essentially distinct in its general character from that which flourished at the time when coal now found in Great Britain was in the course of formation. There were then no oaks, ashes, beeches, or indeed any of our hard wood or fruit trees; palms, yams, bananas, canes, and cereals were also absent. There existed, however, trees allied to the pines, and trees allied to the club moss, but of far greater size, since they grew to a height of even 60 ft., whereas the modern club moss was a low creeping plant. The calamites said to be represented in our day by the Equisetaceae, of which the horse-tail of our swamps and ponds is a familiar example, were also very abundant when coal was being formed. The calamites generally occur leafless. Sigillaria, however, appears to have contributed more than any other plant to the production of coal, but it has no living representatives; it is easily distinguished from the stems of other plants, and externally of lepidodendron, of which family it is a member, by the flutings and striae of the bark being deposited longitudinally or parallel to the axis of the trunk, and impressed with leaf scars at regular intervals between the furrows. During the carboniferous period sigillaria attained grand proportions, and Sir Charles Lyell mentions an individual specimen 72 ft. in length, found at Newcastle, whilst several stems were found standing in the upper surface of a coal seam near Manchester. The lepidodendron was also a well-known carboniferous plant, as well as an abundant one, a specimen found at the Jarrold Coal Mine having been more than 40 ft. in length and 13 ft. in diameter near the base. The lycopodites were a genus allied to the lepidodendron, and these were amongst the principal plants that led to the formation of coal. Our knowledge of the fossil plants of the coal measures, it may be said, is far from complete, yet to the geologist or the geological student there is no study that can be more interesting.

#### MANUFACTURE OF COMPRESSED FUEL.

An interesting paper on the successful manufacture of compressed fuel at Port Richmond, Philadelphia, chiefly descriptive of Dr. C. M. Cresson's and other plans of drying the lumps, was read at the recent meeting at New York of the American Institute of Mining Engineers, by Mr. E. F. Loiseau, who stated that after 12 years' struggle he has obtained results which satisfy him that little remains to be accomplished to make the manufacture of compressed fuel from coal dust one of the most important industries of Pennsylvania; he has, however, still only reached the point at which many other inventors have stopped; he has ascertained what he believes will make his process successful. The mixture which he uses is 91 per cent. coal dust by measure and 9 per cent. pitch. He uses a Dietz's mixer, which with a temperature of 170° to 212° Fahr., brings the mass to a plastic condition in 24 minutes.

The moulding press is composed of two rollers geared together, on the periphery of which is milled out a series of semi-oval cavities, connected with one another, in order to facilitate the dropping of the lumps from the moulds on an endless belt placed underneath. He states that moulding rollers accomplish the compression of materials more by a squeezing or bruising action. They possess the great advantage of squeezing the materials so that the feed is only a short time between the rollers. This advantage is very important one, and it will not be surprising, he thinks, if rollers, as a matter of fact, are destined hereafter to play a great part in the manufacture of artificial fuel. He explains that the particles of coal coated with pitch receive no pressure at the first point of contact from the face of the rollers, but from the drawing-in action of the two revolving rollers. The squeezing pressure which is thus exerted on the materials is produced entirely by the gear of the rollers, because, through the rotating motion, the plastic mixture is drawn into a gradually decreasing compass, and must be highly compressed and moulded. This reduction takes place regularly, both rollers possessing an equal speed. The speed being equal, the product leaves the rollers in the shape given by the moulds.

While experimenting with the fuel in different heating apparatus, he ascertained that when the lumps were but half consumed, if the

poker was handled roughly, the particles of coal would disintegrate, and would fall unconsumed through the grate bars into the ashpan, seemingly increasing the quantity of ashes, but in reality losing the heating power of the unconsumed coal. This was caused when the lumps were red-hot to a depth of about  $\frac{1}{4}$  in. Each lump would then become, so to say, a small retort. The pitch which held the particles of coal together in the centre of the lump would gradually be drawn through the red-hot crust of the lump, and be consumed, and when the lump itself was partly burnt, and reduced to about one-third of its volume, there was not sufficient pitch left in the nucleus to keep the particles of coal together until they were consumed. In order to remedy this defect he mixed with the anthracite coal dust 8 per cent. of powdered bituminous coal. The result was a better fuel, which did not disintegrate, coked in the fire, and was almost entirely consumed, leaving but a small quantity of ashes when compared with the fuel made from anthracite without the addition of bituminous coal.

The fuel is supplied in egg-shaped lumps, and burns satisfactorily. He claims that whilst the double machine of the Société Nouvelle des Forges et Chantiers de la Méditerranée does not exceed 96 tons in 24 hours, the lumps weighing very nearly 3 lbs., his press will manufacture in one hour 13 tons of lumps weighing only  $2\frac{1}{2}$  ozs. each. These lumps require no drying or baking. They are conveyed to a screen in eight minutes, and that time is sufficient to cool the lumps; they are then ready for delivery. The pressed fuel would, he thinks, be much improved if the coal dust were previously washed, and in the erection of new works it would be essential to provide washing apparatus for that purpose. The difficulty now seems to be to secure a sufficient supply of coal dust at the shipping points, and as there is a market for peat and dust the coal companies are indisposed to sell the dust proper at such a low price as would enable the artificial fuel makers to compete with the companies' round coal; but Mr. Loiseau considers that whether the manufacture of the pressed fuel be carried on by the coal companies or by special makers the community would be benefited by the utilisation of coal dust, which has hitherto been worthless material.

**NATIONAL BOILER INSURANCE COMPANY.**—The annual report of Mr. HILLER, the chief engineer—that for 1879—has just been issued. It is suggested that a few rules might be framed by Government for the guidance of boiler makers and owners, but should be such as will not impede improvement—for example, that no iron of less tensile strength than 20 tons per square inch should be used in the construction of steam boilers; that the maker's name and the quality of the iron should be legibly stamped upon each plate; that all boiler makers should stamp, in a conspicuous part of the boiler, their name, address, its year of make, and the pressure per square inch on safety valve for which the boiler is suitable; that all stationary boilers should be so set that their condition may be reliably ascertained; brickwork flues to be large enough to allow access to every part, or so constructed that the boiler may be examined thoroughly when desired. These flues can be thus arranged without reducing the efficiency of the boilers, &c. It is pointed out that this plan involves, in brief, registration, inspection (beyond that by attendants), and careful investigation regarding each explosion. These would neither entail useless expense nor impede progressive improvements, but would check carelessness and reduce the number of explosions. It is declared to be absolutely essential to the safety of all boilers that all the external flues be either large enough for a man to pass through from one end of the boiler to the other, or if the boiler be very small, that large openings, fitted with iron doors, be made to each end of the flues, so that complete inspection can be made; that brickwork in contact with plates should be reduced to a minimum breadth; that at the lower part should never exceed  $4\frac{1}{2}$  in.; that boilers with brick flues should rest on suitable narrow fire-clay blocks instead of upon broad mid feathers or side walls of brickwork; that boilers should never be placed in confined or damp situations; and if want of space necessitates their being placed below the ground level they should be so set as to render it impossible for any external moisture to reach them; and that owners should spare no effort to clean and completely prepare their boilers for reliable thorough inspection. Neglect of this renders it impossible for an inspector, however skilful and careful, to inspect satisfactorily, and the non-detection of a defect may endanger a boiler, and perhaps lead to loss of life.

#### PIVOTING EXCAVATOR.\*

The pivoting excavator, designed by M. Sayn, consists of an iron truck running on six wheels coupled, which carries a platform capable of turning freely round a vertical central pin, which platform bears the engine, the machinery for the transmission of motion, and the framework supporting the excavating gear. The machine can excavate in front by means of its chain of buckets, discharging the material behind by a movable shoot into wagons, thus enabling the whole of the bottom of a cutting to be used for the removal of the earth. It can also work sideways along the slopes of the cutting, to widen it; in this case the excavated stuff is delivered into a long train of wagons at the side. It can be modified by altering the buckets and using a long beam for carrying them, when it is available to work at the edge of a cutting for widening it. The machine can also be readily transferred to a barge, and by varying the form of bucket can be employed as a dredger. Lastly, by substituting a jib for the beam, the apparatus can be used as a movable steam crane turning on its axis. The object is to economise plant by making a machine that, with only slight modifications, shall be capable of satisfying several different requirements.

—By A. MARNIER: *Revue Industrielle.*

\* From JAMES FORREST's "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

**CASSELL'S PUBLICATIONS.**—*Science for All*, part XVII., contains the Sun Telegraph, by Capt. Cooper King; Dew and Hoar Frost, by Dr. R. J. Mann; a Frog, by Dr. A. Wilson; Why a Top Spins, by W. A. Lloyd; and Deep Sea Life, by Mr. P. H. Carpenter. The History of Protestantism, part X., extends from the time when Zwingli, preaching from the passage in Exodus, argued to the conviction of many of his hearers that if the lamb was simply a symbol in the Passover, the bread can be nothing more in the eucharist to the death of Frederick the Wise, elector of Saxony. Great Industries of Great Britain, part XXVII., contains continuations of the treatises on Industrial Legislation, Shipbuilding, Cotton, Wool and Worsted, Hemp, Flax, and Jute, Pottery and Porcelain, and Iron and Steel. Knight's Dictionary of Mechanics, part XL., extends from Lance-Bucket to Leather Scouring Machine. It is announced that the second and third volumes can now be supplied to those who desire to complete at once.

**AMERICAN ALMANAC.**—The third annual edition—that for 1880—of the interesting little volume—the American Almanac and Treasury of Facts, statistical, financial, and political—edited by Mr. A. R. Spofford, the librarian of Congress, has just been issued through Messrs. Trübner and Co., Ludgate Hill. The amount of information given is enormous, and although much is necessarily of only local interest there is much that will be of interest to the European reader, and especially to capitalists who have money embarked in American industries. The almanac will be generally recognised as a very valuable work of reference.

**BLASTING CARTRIDGES.**—The invention of Mr. T. N. HEIDEMANN, of Cologne, relates to improved means for augmenting the effect of the charge in holes drilled for blasting purposes. With this object the inventor employs cartridges of compressed blasting powder specially manufactured. Powder prepared in the usual manner from saltpetre, sulphur, and carbon, is first brought to a high degree of specific gravity—that is to say, from 1.72 to 1.75—by means of hydraulic pressure. The powder, after being granulated in a granulating machine, is then pressed in metal moulds when in a wet condition by very powerful mechanical pressure, whereby it is formed into cartridges of a high specific gravity of from 1.70 to 1.72 of suitable length, and of a diameter corresponding to that of the hole in which the cartridge is to be used. An opening is provided in the middle or at the side of the cartridge for the insertion of the fuse.

#### WATSON BROTHERS' MINING CIRCULAR.

WATSON BROTHERS,  
MINEOWNERS, STOCK AND SHARE DEALERS, &c.  
1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.

Dynamite, now very extensively used in mining operations, is nitro-glycerine mixed with a dry earthy substance. Glycerine itself is an oil obtained in the manufacture of soap. This washed with nitric and sulphuric acids (and then washed with pure water to free it from the acids) forms nitro-glycerine. Guncotton, in the same way, is cotton saturated with nitric and sulphuric acids, and washed to get rid of the acids. There is a blasting gelatine of greater force than either of the above in use on the Continent, and used latterly in the St. Gotthard Tunnel. This consists of nitro-glycerine and colloidion, of the former 93 to 96 parts. The force of these blasting commodities may be given as follows, taking nitro-glycerine as the unit—Guncotton, 0.67; dynamite, 0.69; gelatine, 1.2.

We know nothing of the Plympton Mining Company or of the parties connected with it, and cannot, therefore, answer the question put to us by more than one correspondent.

We have received this week a long anonymous communication respecting a mine near Tavistock; and we can only repeat that we dislike all *anonymous* attacks, whether upon men or upon mines, and anonymous writers should at least pay the postage of their letters.

At D'Esresy Consols the Gorse lode looks better. The heading is 3 ft. wide, with patches of lead and blende throughout.

The sampling at Wheal Crebor is 430 tons of ore of better quality than the last. At the meeting the agent estimated it at 400 tons this time, and 500 to 550 tons for the following, so that about 1000 tons will come to the credit of next meeting, and show a large profit.

The trial in the new western ground at Carnarvon Copper, the agent writes us, "is looking very promising; there is a strong mixture of mudi and black jack, just the same kind of lode that there is about the outcrop in the old mine, where so much copper was raised. There are now strong spots of copper mixed with the mudi and blende, and in the spar of the lode." This, as we have said before, may make a new mine. At the old mine forking the water progresses.

Glenroy is yielding some rich stones of lead ore in the bottom level north, and the shaft is to be sunk with all speed.

We look for a good improvement in Parys Corporation, and also a good rise in shares. The market was knocked down from 37s. 6d. to 2s. through market operations alone.

**MR. WILLIAM H. H. WATSON, DEALER in RAILWAY STOCKS and MINING SHARES** at net market prices of the day.

A few months ago W. H. H. W. called particular attention to Wheal Crebor, and supplied his clients with them at 5s. to 10s. each. He would now call attention to POLROSE MINE, in which there may be a great rise in a few months. Shares are now £2 $\frac{1}{2}$ , £2 $\frac{1}{4}$ .

Address: W. H. H. WATSON, 1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON, E.C.

#### Original Correspondence.

##### THE FLAGSTAFF SILVER MINING COMPANY OF UTAH.

SIR,—It is at all times very unsatisfactory to reply to anonymous correspondents, and I should not in this instance have noticed the letter of "Vigilant" which appeared in the Journal of last week did it not contain statements which are calculated to mislead. He has thought fit to question the contents of my letter which appeared in your Journal of the previous week, or rather that portion of it referring to the title of the Flagstaff Mining property, and I may remark that had he known the true position in which the late litigation left the various suits to which he refers he would not have committed the blunders which he has, whether knowingly or otherwise, conveyed to you as facts. He infers that the statement contained in my letter is erroneous, and quotes, first the suit of *Billing v. Tarbet* to endeavour to show that the title to the property is not clear. But would it not have been better for him to have ascertained the real facts of this case before he brought his observations so prominently before the public? He states that "the suit of *Billing v. Tarbet* affecting the principal mine has been appealed to Washington." Now from what source did he obtain this information? Although I have not seen the Salt Lake Daily Tribune of Jan. 31, I have seen that of Feb. 15, in which I read that the suit of F. W. Billing v. Helen Tarbet *et al.* came before the District Court of the Third Judicial District, Utah Territory (which is the Court of First Instance), and a decree was made on Dec. 9, 1879, placing Billing in absolute possession of the three-fourths of the South Star and Titus Mine claimed by Helen Tarbet, the defendant (the remaining one-fourth being already in his possession), and it further enjoins the defendant from setting up any claim of title or possession to said premises or any part thereof. It further states that a motion for a new trial was pending, but that the parties to the litigation have since come to an arrangement by which these long-standing disputes will be decided. So, sir, you will observe that not only has the case not been appealed to Washington, but that it has not even gone to the Supreme Court of the Territory.

With respect to the suit *Varnes v. Billing*, I was informed some time since, on good authority, that that suit had been amicably arranged, and that a clear title to that part of the property can also be obtained. Your correspondent evidently centres his attack upon me by quoting the case of *Erwin Davis v. The Flagstaff Company* *et al.*, but here he has again fallen into a grave error. If he knows anything about this suit he must also know that it in no way affects the title to the property. It is simply a money claim against the company, having no reference to title. The Supreme Court of Utah, in June last, decided in favour of the company, and held that Davis never had any mortgage or lien upon the property, and through this decision the title to that valuable but small portion of the lode containing the main workings and shafts which remained to the company under the decision of the Supreme Court at Washington in the *Flagstaff-Tarbet* suit reverted to the assignees of the judgment creditors of the company, and whatever proceedings Erwin Davis may take can only be against the company, and will in no way affect the title to this property, and considering the very strong terms in which the decision is couched I fail to see that he has the slightest chance of succeeding should he be so injudicious as to carry his appeal to Washington. Besides, the Flagstaff Company has a counter claim against him for far more than the amount he claims from the company.

I submit that I have disproved the statements of "Vigilant" as regards the *litigation suits*. But I must add a few words more respecting the "title" question to which your correspondent refers, and he makes the extraordinary statement that "there would appear to be ample grounds for Mr. Pearson's circular stating that the company did not 'know much about the title.'" Now, I should think that even Mr. Pearson himself will feel aggrieved at this. Why did he not some months since, when ventilating his "proposals," state through the medium of your valuable journal that he himself was in a position to give a clear title to the properties? But, apart from this, it has been ascertained that a clear title can be by the acquiescence of the company be obtained, which acquiescence would, no doubt, be given in case of the shareholders being equitably dealt with.

You may depend upon it, Mr. Editor, that the members of the syndicate, through their trustees, will give due attention to the question of "title," &c.; and I have no doubt also that they will estimate the observations of "Vigilant" at their proper value, "that



## Mining Correspondence.

## BRITISH MINES.

**ABERLYNN.**—John Roberts, March 31: There is no change in any of the points to notice since last week. The Valley cross-cut contains some nice faces of lead, and is getting rather wet, which shows that we must be getting near the lode. I should like to drive on the lode that we passed through about a fortnight ago, as it looks very kindly for lead, but at present we must push on the cross-cut to cut the great lode.

**BEDFORD UNITED.**—R. Goldsworthy, March 31: Driving is now being carried on by the side of the lode in the 133 and 135 fm. levels east. The lode in the winze sinking in bottom of this level is 3 ft. wide, worth 12*l.* per fathom. No other change to notice since last report.

**BELL VEAN.**—James Bray, March 27: There is no change to notice in the cross-cut during the past week; the men are making fair progress in driving the same.

**BETWS-Y-COED.**—M. H. Whitford, March 31: The 30 to drive east of the flat-rod shaft, by six men, at 12*l.* 10*s.* per fathom; the lode is 2 ft. wide, of a very kindly appearance, and yielding 12 cwt. of lead ore per fathom. A stope in the back of the 30 west of flat-rod shaft is set to two men, at 4*s.* per fathom; lode yielding 15 cwt. of lead ore per fathom. A stope in the back of the 20, east of flat-rod shaft, on the south part of the lode, at 20*s.* per fathom, to two men, the month, yielding about 12 cwt. of lead ore per fathom. The deep adit end to drive by four men, at 70*s.* per fathom; lode 4*s.* ft. wide, the character of which is all that can be desired for the production of lead, and yielding from 16 cwt. to 20 cwt. of lead ore per fathom. A stope in the back of deep adit level, on the north part of the lode, by two men, at 2*s.* per fathom, yielding 3 cwt. of lead ore per fathom. A stope in the back of the deep adit level, on the south part of the lode, by two men, at 20*s.* per fathom; lode 4*s.* ft. wide, of a very kindly appearance, and yielding 12 cwt. of lead ore per fathom. A stope in the back of the 30 west of flat-rod shaft is set to two men, at 4*s.* per fathom; lode yielding 15 cwt. of lead ore per fathom. The deep adit end to drive by four men, at 70*s.* per fathom; lode 4*s.* ft. wide, the character of which is all that can be desired for the production of lead, and yielding from 16 cwt. to 20 cwt. of lead ore per fathom.

**BLUE HILLS.**—S. Bennetts, March 27: The lode in the 42 east end, although small, contains some good tin-stuff. In the west end, in this level, it is 2*s.* to 3*s.* ft. wide, and worth 3*l.* per fathom. The 30 east end is now worth 7*l.* to 8*l.* per fathom, and the rise above this level is worth 20*l.* per fathom. The lode in the 20 east end is 2*s.* ft. wide, producing low quality tin-stuff.

**BODIDRIS.**—H. Hockhiss, March 31: The 60, east on the Maes-y-pwll lode, is going forward in a promising lode, which contains some lead ore, but not in sufficient quantities to save. The winze sinking in the bottom of the 17 also contains a little lead ore, and about 3 yards more sinking will put this winze through to the 60.—**Meadow Shaft:** We are steadily going on sinking this shaft below the 90.—**Meadow Shaft:** We are steadily going on sinking this shaft below the 90 yards level; the ground is more favourable for breaking than at the commencement. No change in any other part of the mine. All is being urged on as fast as possible.

**BWLCH UNITED.**—N. Bray, April 1: I have just returned from the mine, and am pleased to say the lode in rise in bank of 70 has considerably improved, and is in doubt entering the ore deposit in the bottom of the 63. The 10*s.* looks encouraging, and the lode is improving. All other operations underground as well as at surface are progressing favourably.

**CAMBRIAN.**—T. Glanville, March 27: **ESCAIR FRAITH**, Eastern Shaft: The part of the lode sinking on below the 86 yard level, will yield 3 tons of copper ore per yard. The stope in back of the 86 and 70 yard levels, east of shaft, will produce 2 tons each of copper ore per yard. In the 86 yard level, driving east of shaft, we are at present going by the side of the lode, and occasionally cutting in south, where we find good stones of ore. The lode in the 46 yard level, east of shaft, is composed of gossan, intermixed with good stones of copper.

**CARNARVON (Copp'r).**—John Roberts, April 1: At Garnon's the water is forked 2 fathoms below the 26, and pumps working well. At the new shaft we have forked about 18 fathoms, and I expect that with good speed we shall, in about a fortnight more, get down to what is called the bottom of the Cae-y-Groes, the 36, after which we shall not have much else but the shaft to clear of water. The new trial on the western ground is looking very promising. The is just exactly of the same character as the lode in the old mine at the outcrop, where it made all the copper. It is about 12*s.* ft. wide, with strong mundic and black jack, with a mixture of copper throughout. I have great confidence in this part of the mine. There is no reason that can be assigned why it should not be as productive as the old mine; but there are reasons to believe that it will be, because there are the same kind of indications apparent enough.

**CLEMENTINA.**—John Roberts, William Sandoe, March 31: The points of operation during the past month have been the same as the previous month, with the exception of the bottom of the 25, south of the engine-shaft, where we have had two men stowing. There is here a nice branch of lead, but rather wet for working till the 34 end be driven to drain it. The rise in the 34 is still much the same as reported through the month—a good branch of ore in each end, but in the middle the lode is poor and pinched—rather small. We should say here that the lode in the south end is very open, and very likely to improve, as is usual under such circumstances. The sump in the bottom of the 15, which is being sunk to meet the rise, is down from 5 to 6 fms. There is a good branch of ore in the south end, and extending nearly the whole length of the sump. We have about 10 fms. of ground to sink and rise to get a communication, which when made will, we believe, open a good piece of stowing ground. We have been preparing for stowing the bottom of the level at the roadside shaft, by fixing launders to take up the water, and have now commenced working. In starting from the shaft the lode is rather poor, but in 3 or 4 yards from the shaft the lode is much better, and we anticipate will pay well for working.

**COBBMARTIN.**—T. Harris, T. Comer, April 1: In the winze below the adit level on the north caunter lode, the lode continues its masterly character of fully 5*s.* ft. wide, containing congenial-looking quartz and soft killas, with large seams of mundic. The lode shows fine lead disseminated throughout its whole width, but not enough to save; but the lode is improving in appearance the deeper we go, and we shall be very much disappointed indeed if we do not meet with a good deposit of lead in sinking this to the 17 in the lode of such a fine appearance. The lode in the adit level south-west is without change. There is about 1 ft. of water in the 17, but we hope that in a few days more the level will be dry so as to enable us to resume working there.

**CROOK BURN.**—John Vipond, March 27: We have got the water out of shaft at Crook Burn; we have had eight men on this week. There are some little repairs to make in the shaft, on account of having to take the pump down the main way amongst the ladders. We have not got on as well as I wished with the pump, but I hope with a little more experience that we will get on better. We have been repairing the water-course from John's Burn to shaft top for the supply of boiler. We have got the new stable set up and the roof on. The windows and doors want fixing, and the inside paving, and the stables fixing, before it is completed.

**CWM DWYFOR (Brynnarian).**—John Davies, April 1: The water is now down to 16 fms. from surface. I expect it will be all out by the end of this week, when we shall fix the ladders and timbers, and I shall set the men to drive the 20 fm. level west.

**CWM PRYF.**—Absalom Francis, April 1: Taking the underground bargains altogether, they never looked so well as they did yesterday. Whilst our contractors and myself were on the mine there was a stone of ore brought out from the eastern stope from 2 to 3 cwt. in weight, and so fine a specimen that it would be difficult to match it again in this country. It is my firm belief that all I have said will be realised, and that we are rapidly opening out a mine of no ordinary character. The works we are now carrying forward will soon throw a great light on our future, and I believe it will be a lasting and a bright light we shall disclose. Our progress and setting take place on Saturday, and next week a full report and values of bargains will be given.

**DEANBIGHSHIRE CONSOLIDATED.**—R. Prince, A. Prince, April 1: Since our last we have been raising splendid ore from the stope in the 66 west; today they are looking as well as ever, yielding capital rich lead. We are driving a level out of the 66 to meet with the same run of ground that the stope are producing their lead, and we are sanguine of good results therefrom. The 112 east main lode continues to improve; the rib of spar on the heading side is strongly impregnated with lead, and we shall be much disappoined if a good course of lead is not met with shortly. At both cross-cuts good progress is being made: the southern one is in hard ground, and we cannot yet report any further intersection of branches, but the one in the north is becoming jointy, and is likely to be near the lode. We are busy on the dressing-floors, and shall have the smelters' carts to-morrow to fetch away another parcel of lead ore—say 9 tons.

**DERESBY CONSOLS.**—J. Roberts, W. Sandoe, March 31: There is no change in the Cobbler's lode. The Red lode seems to be more defined. The Gores heading continues to improve, both the lode and the containing rock. There are good patches of lead and blende through the lode, which is 5*s.* ft. wide, and well defined.

**DERESBY MOUNTAIN.**—J. Roberts, W. Sandoe, March 31: You are aware that at the No. 2 we have let the stope on tribute at 6*l.* 10*s.* per ton of dressed lead. The lode is looking very well, and the men likely to get good wages. We cannot speak of any change at the No. 5. We have sunk about 6 ft. in the sump for a deeper stope, and have lengthened about 6 ft. on each end, so as to make every possible advantage for breaking the lode at the cheapest rate, but with all that we can do it will bear no comparison with the amount of stuff we shall be able to bring to surface when we get down and have communication with the No. 6. The Gores shaft is progressing very favourably. We have sunk close on 4 fms., and have put down the pump, which is working well. We expect that in two months more from the present time the shaft will be down to the 15 fm. level, or No. 6. The dressing is going on regularly. We have run rather short of water for the last week or two, but there seems to be a change in the weather, and we shall no doubt be helped by it. We have repaired all the damage that was caused by the heavy flood of rain that we had at the commencement of the month.

**DERWENT.**—J. Morpath, March 30: The several points in operation here as regards value remain just the same as stated in the setting report posted this day week. The 95, on middle flat, east of Jeffries' shaft, is looking stronger, and in it the open flat, not very thick, still continues. This flat containing good ore we are carrying the level 9 ft. wide, the worth for this width being 7 cwt. of ore per fathom. The workings over this level are worth 14, 15, and 16 cwt. of ore per fathom respectively, while the respective yield of those over the 93, west of shaft, is 16, 18, 18, 11, and 13 cwt. of ore per fathom.—**San Vein:** This vein in the 70, east of shaft, yields 11 cwt. of ore per fathom.—**Westgarth's Shaft:** Middle Vein: Here the stope are yielding in the back of the 23, east of shaft, 19, 15, 11, 14, 24, 18, and 18 cwt. of ore respectively per fathom. The cross-cut at this level still goes rapidly—quite 3 fms. a week at present. The rise at the 74, at the junction of middle and Burnshield's Haugh vein, as stated in last report, is going up by side of lode, which when we get more up into the heart of the set will be stripped down. Drawing, pumping, and dressing all going well.

**DEVON COPPER AND BLENDÉ.**—Wm. Skewis, April 1: The deep adit is cleared and secured a few fathoms beyond Derrick shaft, and a considerable quantity of water let down. I expect to get the engine-shaft cleared and secured to the deep adit by the end of next week, when I hope to be able to make a thorough inspection of all the ground at and above that level, and be in a position to set pitches on tribute. I am getting everything pressed forward so as to get to the bottom of the mine with as little delay as possible. I go with the company's engineer in a day or so to see some engines which are for sale,

and so be in a position to report the result at the next directors' meeting, to enable them to decide which to select.

**DEVON GREAT CONSOLS.**—Isaac Richards, April 1: Wheal Josiah—New South Lode Shaft: In the 130 west the lode is 2 ft. wide, composed of capel, quartz, mundic, and a little copper ore. In the 115 west the lode is 2 ft. wide, composed of capel, quartz, peach, mundic, and a small quantity of copper ore.—Wheal Emma. Inclined Shaft: In Dawes' cross-cut south, at the 190 east, the ground during the past few days has been hard, which has rendered our progress slow. It is, however, now improved again, and fair progress in driving is being made. In the 137 east, east of Friend's cross-cut, the lode is 4*s.* ft. wide, composed of capel, quartz, peach, mundic, and some good quality copper ore.—New Shaft, New South Lode: In the 205 west the lode is from 4 to 5 ft. wide, composed of capel, quartz, peach, mundic, and a small quantity of copper ore. This point of operation is temporarily suspended, the men being engaged in the back of the 175 west. In the 190 east the drivage is being carried at the side of the lode for more speedy progress. In the 190 west the lode, part carried 1*s.* ft. wide, is composed of capel, quartz, mundic, and some good quality copper ore. In the 175 west, east of Bartlett's winze, the lode, part carrying, 4 ft. wide, is composed of capel, quartz, peach, and copper ore, worth 1 ton or 3*s.*, and 3 tons of mundic per fathom. In Marshall's rise, in the back of the 175 west, the lode is 4*s.* ft. wide, and worth for length of rise (9 ft.) 4 tons of copper ore, 1*s.* ft. wide, and 3 tons of mundic per fathom. In the 115 east the lode is 4*s.* ft. wide, composed of capel, quartz, peach, mundic, and a little copper ore. In the 100 east the lode is 3 ft. wide, and continues very promising, being composed of capel, quartz, peach, mundic, and a little copper ore of good quality.—Railway Shaft: At the 190 the work in connection with cutting of pats, &c., is progressing very satisfactorily. In the 175 west the lode is 4 to 5 ft. wide, composed of capel, quartz, peach, mundic, and a little copper ore of good quality, and promises improvement. In the 180 west the drivage is being carried by the side of the lode.

**DUBBY SYKE.**—W. Vipond, March 26: The end of the level, west from shaft, still continues very hard, which has rendered our progress slow. It is, however, now improved again, and fair progress in driving is being made. In the 130, east of Friend's cross-cut, the lode, part carrying, 4 ft. wide, is composed of capel, quartz, peach, and copper ore, worth 1 ton or 3*s.*, and 3 tons of mundic per fathom. In Marshall's rise, in the back of the 175 west, the lode is 4*s.* ft. wide, and worth for length of rise (9 ft.) 4 tons of copper ore, 1*s.* ft. wide, and 3 tons of mundic per fathom. In the 115 east the lode is 4*s.* ft. wide, composed of capel, quartz, peach, mundic, and some good quality copper ore. In the 175 west, east of Bartlett's winze, the lode, part carrying, 4 ft. wide, is composed of capel, quartz, peach, and copper ore, worth 1 ton or 3*s.*, and 3 tons of mundic per fathom. 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rapidly from 81 to 84. Waterworks shares were sold at lower prices, Southwark for instance, rising to 195. Chapel House Colliery, 20s. to 30s. Newport, Abercarn, 6½ to 7; Tiverton Brewery, 4 to 5. Grand Trunks rose finally from 5½ to 1 all round.

FERDINAND R. KIRK.

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### The Mining Market: Prices of Metals, Ores, &c.

METAL MARKET—LONDON, APRIL 2, 1880.

	IRON.	£ s. d.	£ s. d.	TIN.	£ s. d.	£ s. d.	£ s. d.
Pig, O.M., f.o.b., Clyde.	2 15 0	—	—	English, Ingot, f.o.b.	91 0 0	—	—
Scotch, all No. 1 ...	2 19 0	—	—	" bars ...	92 0 0	—	—
Bars, Welsh, f.o.b., Wales	6 15 0	7 5 0	—	" refined ...	93 0 0	—	—
" in London.	7 5 0	7 15 0	—	Australian ...	85 10 0	85 15 0	—
" Stafford.	9 0 0	9 10 0	—	Banca ...	86 0 0	—	—
" Tyne or Tees ...	7 10 0	8 0 0	—	Straits ...	85 10 0	85 15 0	—
Swedish, London ...	11 15 0	12 10 0	—				
Rails, Welsh, at works ...	7 10 0	7 15 0	—				
Sheets, Staff., in London ...	11 0 0	11 10 0	—				
Plates, ship, in London ...	10 0 0	13 10 0	—				
Hoops, Staff., ...	10 0 0	—	—				
Wall rods, Staff., in Lon.	8 10 0	9 10 0	—				
STEEL.							
English, spring ...	16 0 0	19 0 0	—				
" cast ...	30 0 0	40 0 0	—				
Swedish, keg ...	15 0 0	—	—				
" fag. ham ...	16 0 0	—	—				
LEAD.							
English, pig, common ...	16 5 0	16 10 0	—				
" L.B. ...	16 15 0	—	—				
" W.B. ...	17 0 0	—	—				
" sheet and bar ...	17 5 0	—	—				
" pipe ...	17 15 0	—	—				
" red ...	19 5 0	—	—				
" white ...	25 0 0	—	—				
" patent shot ...	19 10 0	—	—				
Spanish ...	16 2 6	16 5 0	—				
NICKEL.							
Metal, per cwt ...	15 0 0	16 0 0	—				
Ore, 10 per cent, per ton ...	20 0 0	25 0 0	—				
QUICKSILVER.							
Flasks, 75lbs., war. (nom.)	6 15 0	7 0 0	—				
SPelter.							
Sheeshan ...	20 5 0	20 10 0	—				
English, Swansen ...	21 0 0	—	—				
Sheet zinc ...	25 0 0	—	—				

\* At the works, 1s. to 1s. 6d. per box less for ordinary; 10s. per ton less for Canada; IX 6s. per box more than 10 quoted above, and add 6s. for each X. Terne-plates 2s. per box below tin-plates of similar brands.

REMARKS.—The Easter holidays being over, the trade has now probably only to await the completion of the general elections before it again resumes its ordinary dimensions; and there are many things which tend to strengthen such a view, for already there have been signs this week of approaching activity, and it seems merely a matter of time before the animation is re-established. The inanimate appearance of our markets has not been brought about so much by the falling off in the legitimate demand, although *bona fide* enquiries have been less numerous; but the dulness has been occasioned chiefly by the want of a speculative demand, caused by the unsettled state of political affairs, as well as from the realisations of prompts falling due. But the principal number of the forward contracts have now been mostly arranged, and consequently the settlements still incomplete will soon have run off, after which time the markets will be placed upon a sounder basis, and possess the better chance of a permanent improvement. The reports from the country go to show that there are still many orders being received at the works, and although somewhat less than they were a month or two ago, still they are much more numerous than they were during the same time last year. All our works, mills, and forges are said to be actively engaged, and there are but few where full time is not being employed; and, therefore, the dulness really amounts to little more than a subsidence of speculative inflation, and leaves the material progress of our trades unchecked. The vast increase in the goods traffic returns of the principal railways throughout the country is a sure sign of the revival in trade, for the aggregate increase on sixteen of the chief lines for the twelve weeks ending March 20 last is reported to have been no less than 8 per cent, above what it was for the corresponding period of 1879. This augmentation is said to be the result of *bona fide* trade, and quite apart from the market speculations. During the week, while the markets have for the most part remained quiet, sellers in some instances have shown considerable firmness in their quotations. Nevertheless, in other cases some violent fluctuations have taken place, caused chiefly through rather unexpected circumstances.

COPPER.—On the resumption of business last Tuesday this market manifested a more gay and animated appearance than had been the case for some days previously, and by second change sellers had succeeded in raising the price of Chili bars to 66s. to 66s. 10s. cash, and 67s. 10s. to 68s. forward, which figures were maintained on the following day. This improved tone was probably the result of the light charters which were announced too late last week to make any particular impression upon the market before the holidays, although, as we reported at the end of our last article, the market closed somewhat firmer. Yesterday, however, the market again became dull, and prices receded to 65s. 10s. cash, with only a limited business being transacted. The immediate tendency of this market appears a little undecided, for no one is operating extensively either for a rise or a fall, orders for both consumption and shipment being still limited. As buyers keep so inactive they are, in all probability, drawing on their private stocks, and if this be the case these stocks must sooner or later be exhausted. Consequently it would appear that *bona fide* orders are only suspended for the time being, and must be renewed hereafter with augmented quantities as it is certain that the requirements of copper are annually increasing. The statistics published on the 1st inst. are unsatisfactory in so far as they show the public stock to have increased to 63,558 tons, against 62,902 tons on March 1, and 54,981 tons on April 1, 1879. The stock of Chili produce in first and second hands in Liverpool and Swansea for the last fortnight of March slightly diminished, being on the 31st ult. 33,000 tons, against 33,109 tons on the 15th ult. The deliveries were only 1109 tons, against 1415 tons for the same time last year, and the imports for the corresponding period were 1000 tons, against 1333 tons.

IRON.—This market remains in a rather less satisfactory condition, the warrant market keeps quiet, and the manufactured trade is also dull. The electioneering excitement has checked the progress of the home trade, and shippers finding that prices are slightly tending in their favour continue to withhold their orders for the time being, in the hope of being able to place them on more advantageous terms hereafter. Speculators are very inactive, nevertheless it is thought that after the country becomes more settled the home trade will expand, and a proportionate advance will be effected in prices, and also when shippers again find that quotations are moving upwards the demand will be augmented for shipments, and speculators and investors will be eager to again make purchases in the hope

of retrieving present losses. In the various producing districts business has been checked more or less by the holidays, and on account of the elections the attendance on several of the country markets has been comparatively small. The approach of the quarterly meetings, which will be held next week, is preventing any material change in the prices of manufactures. The Middleborough market is reported rather quiet, and the stock in Connal and Co.'s yards said to have been reduced by 1571 tons for the week, and 5408 tons for the month, and now amounts to only 98,150 tons. Prices are uncertain, and but few fresh orders have been booked. Second-hand parcels of No. 3 have been offering as low as 50s. to 51s., but these reduced figures form little or no temptation to induce buyers to operate. Notwithstanding the holidays, the deliveries last week were very satisfactory, and the total for the month of March is estimated at about 80,000 tons. Prices for foundry iron are rather lower, and orders are less numerous. The demand for railway material has also considerably slackened, and hematite iron is now selling at much cheaper rates. The manufactured trade is dull, and some sellers have occasionally slightly reduced their prices, ship-plates being quoted at 8s. 12s. 6d. to 8s. 15s., rails at 7s. 15s. to 8s. 2s., bars at 7s. 10s. to 7s. 12s. 6d., and angles at 7s. 15s. per ton. The Wolverhampton market keeps unsettled, and prices continue nominally about the same as was quoted last week, and it is expected that little or no alteration will be made in quotations at the quarterly meeting next week.

The various mills are not so well employed, especially those who roll special brands, nevertheless it is reported that there are still large orders on hand for hoops and strips for American account. A moderate enquiry exists for sheets at 10s. 10s. to 11s. for galvanised sheets, 10s. for working up sheets, and 16s. for the best stamping sheets. Boiler plates are selling at 10s. 10s., while inferior qualities are quoted as low as 10s. per ton. There is not so much briskness on the Birmingham market, but most of the leading establishments are said to be fairly active. It is stated that after the elections are over Mr. Chamberlain will be requested to arbitrate between employers and employed relative to a further application for advanced wages. As the best brands are now selling at 15s. per ton below what is realised a few weeks back masters contend that wages should be reduced rather than increased. Business at Sheffield has become more slack, and consumers finding that by detaining their orders makers appear inclined to make concessions they show no disposition to press purchases. Sellers of common qualities are much weaker in their quotations, and the demand keeps restricted. The trade in the Welsh districts has undergone no material change during the past week; quotations are maintained, and the works are going full time. The demand is not confined to America, but India and Australia are said to be participating, and masters keep their order-books well filled. On Tuesday the Glasgow warrant market opened at the same figure at which it closed last Friday—55s. 4½d., and advanced to 56s. 4½d., but receded to 55s. 6d., closing thereat, and remained dull at about this figure until yesterday, when 55s. was accepted, and the market closes this afternoon at that price.

#### SHIPMENTS—FOREIGN AND COASTWISE.

For the week ending March 27, 1880. .... Tons 23,597  
For the week ending March 29, 1879. .... 9,463

Total from Christmas to date:

1880. 1879. 1878. 1877. 1876. 1875.

190,145. 109,859. 89,478. 93,525. 97,168. 122,458

Furnaces in blast at date:

1880. 1879. 1878. 1877. 1876. 1875.

114. 90. 91. 109. 119. 119

Imports of Middlesborough Pig-Iron into Grangemouth:

For the week ending March 27, 1880. .... Tons 1,725

For the week ending March 29, 1879. .... 660

Decrease on 1879. .... 5,109

Stock in Connal and Co.'s Glasgow Stores:—March 27, 1880, 439,634; Christmas, 1879, 415,625; Christmas, 1878, 199,417 tons.

TIN.—During the week this market has been subject to some violent fluctuations, but dealings have been fairly numerous. The quotation for Australian and Straits at the close of last week was about 84s., but on Tuesday up to 88s. was paid. On Wednesday the Banco sales at Amsterdam not having realised so satisfactory a figure as was expected, prices for fine foreign receded to 85s.; but the price was quoted yesterday in the official list at 85s. 10s. to 86s. cash, and the market closes to day at 86s. The statistical position of this metal is fairly satisfactory. The stock has been reduced to 14,174 tons, against 14,562 tons on Feb. 28. The deliveries for last month were scarcely so good, being 3181 tons, against 1778 tons in February. The shipments to England, however, were very limited; those from the Straits being nil, while from Australia there were only 40 tons.

LEAD.—Undisturbed quietude continues to characterise the course of this market, and quotations are lower than they were last week. The shipping demand is very inanimate, and especially for India and China, the latter formerly being a very large market for this metal.

SPELTER.—This metal is still dull of sale; nevertheless, sellers maintain their prices with firmness for ordinary Silesian brands at 20s. 10s. per ton, and English at 16s.

STEEL.—There is a moderate demand, and quotations make little or no alteration.

TIN-PLATES continue in limited request, and prices tend in buyers' favour.

QUICKSILVER has been dull at 7s., with second-hand sellers somewhat under the official quotation.

COPPER.—Messrs. Richardson and Co (April 1) write—The stocks of foreign copper produce remaining unsold at Swansea this day are—Chilian, 730 tons; Newfoundland, 876 tons; Spanish, 435 tons; Portuguese, 699 tons; British, 58 tons; New Quebrada, 683 tons; Dutch, 398 tons; Total, 3879 tons; regulus, 710 tons; copper, 7058 tons. These totals represent about 7500 tons of fine copper. The only private sales of furnace material reported during the past month have been three parcels of Cape ore, together about 800 tons, at 13s. 9d. per unit. The Chili charters for the past month are 2700 tons fine. For the same period for three years previous they were—1879, 2657 tons; 1878, 3999 tons; 1877, 2528 tons. The past month opened with a strong disposition on the part of holders of Chili bars to sell, hence values fell, and although at times there have been reactions, the general tenor of the month's business has been of a drooping character, and our closing quotations for g.o.b.s. fell short by about 5s. per ton as compared with a month ago. No doubt this state of business has been largely brought about by the excitement attendant upon the general election, which has caused a curtailment of business all over the country.

Immediately after the Easter holidays the dealers in the MINING SHARE MARKET were principally engaged in the settlement of the fortnightly account, and business on the whole has not been particularly active, though a sudden spurt in the tin mines on Tuesday gave for a time a little more animation to the market. Our quotations in the most part are merely nominal.

TIN.—In anticipation of a good Banco sale tin shares became suddenly in demand on Tuesday, and a good rise took place nominally in many of them. The Dutch sale, however, appears to have been somewhat disappointing, and on Wednesday the Cornish smelters lowered the standard for ore in Cornwall 3s. per ton, and tin shares became weaker all round. Carn Brea leave off 8s to 9s.

Dolcoath, 5½ to 60; at the meeting on Monday the dividend is expected to be 2s. per share. Tincroft, 18½ to 19½; East Pool, 34 to 36; Cook's Kitchen, 6½ to 7; East Lovell, 1½ to 2; Polrose, 2½ to 2½; South Conderrow, 11 to 12; South Frances, 16 to 17½; West Bassett, 18



## COAL MINES REGULATION ACT, 1872.

EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.  
DISTRICT UNDER THE CHARGE OF T. CADMAN, ESQ.,  
H.M. INSPECTOR OF MINES.

PERSONS desirous of being EXAMINED in this District for MANAGERS' CERTIFICATES OF COMPETENCY, under the above-named Act, should at once COMMUNICATE with the Secretary to the Board of the above-mentioned District at the following address:—Winnalls Hill, Coleford, By order of the Board,

J. T. THOMAS, Secretary.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

## Notices to Correspondents.

Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be filed on receipt; it then forms an accumulating useful work of reference.

NEW FOWEY CONSOLS.—Some time ago I observed in the Journal a report that an important discovery has been made at New Fowey Consols (formerly Wheal Tregos) Tin Mine, Cornwall. Will any of your correspondents be good enough to give some information regarding the mine? I have failed to obtain any from Mr. Thomas Crapp, St. Columb, who is or was secretary.—S.

MICA.—Will any of your readers inform me as to the uses of mica, prices, &c.? Is there a ready demand for it? Who are the buyers?—J. H. B.—[We have an article in type on this subject; it will appear in this or next week's Journal.]

ROYAL SCHOOL OF MINES.—"Enquirer" (Sheffield).—The information asked for is given each year in the official return. In the session 1875-76 the total number of students in the Royal School of Mines pursuing the full course of study leading to the Associateship was 38, of whom 4 were exhibitors. During the session 1877-78 the number was 35, of whom 6 were exhibitors. As to the special students for mining and metallurgy, there were for mining 9 in each of the sessions mentioned. For metallurgy there were 5 in the session 1875-76, and 14 in that of 1877-78. The total cost of the school to the nation is also given annually in official returns.

GOLD MINING IN SURINAM.—"H. J. G." (Manchester).—The company is an ordinary English limited liability company, although the property is situated in a Dutch colony. The purchase money was clearly stated in the prospectus, published in the *Mining Journal* of March 20—275,000*l.*, of which 210,000*l.* is payable in cash, and the remainder in fully paid shares—and shows that there will be 25,000*l.* working capital. It is estimated that this amount will earn 42,000*l.* per annum, or 16 per cent. on the total capital. It is suggested in Paris that if properties in Guiana can be so advantageously sold, the mineral resources of French Guiana ought to be turned to account.

ORDINARY AND BONUS SHARES.—"W. M." (Middlesbrough).—As to whether you ought or ought not to be required to pay for stamps and fees on bonus shares, no opinion could be given without consulting the company's Articles of Association, which "W. M." had better submit to his solicitor before either parting with his money or accepting the shares. As a rule, bonus shares are altogether delusive, being created only to attract the capitalist who foolishly supposes that if he receives an ordinary share and a bonus share (the capital of the company being, for example, in 10,000 shares, of which 5000 are bonus shares) for 4*l.*, he has some greater advantage than if he had one ordinary share, all the bonus shares being extinguished. Bonus shares should always be regarded with suspicion, but if they are purchased and not received on allotment, stamp duty, &c., would be payable as on any other share.

Received.—"M. C." (Yarmouth): We may be able to ascertain the address—P. W. B. (Dunfermline); No.—"J. A. J." (Gijon); "W. Y."—"Investigator" (North Laxey, and North Lovell); "Looker-on" (Devon Great Consols, and Gwern-y-Mynydd); "Shareholder" (North Lovell); "Dead-Weight"; "Shareholder" (East Chiverton); "Shareholder" (Wheal Creb) —"Shareholder" (Alltarni Colliery); "D. C. D."—"H. W."—"E. R. W."—"Phoenix" (Cornwall Great Consols); "P." (West Devon Great Consols, and Devon Copper and Blende); "A. D."—"Shareholder" (Wheal Creb); "Old Reader" (Richmond); "A Thoughtful Man," on the Future Prospects of Mining, should publish his views in a pamphlet form—W. B. Palmer (Chontales).

THE MINING JOURNAL,  
Railway and Commercial Gazette.

LONDON, APRIL 3, 1880.

## MINING TIMBER, AND TIMBERING IN MINES.

Seeing that in the present state of trade the greatest economy in the working of mines has become essential, too much attention cannot be paid to the timber used in mining operations and the best mode of placing it. Yet experiments for the purpose of showing the relative durability of different kinds of wood are almost unknown, although the value of such information can scarcely be over-estimated. The subject appears to have been overlooked by our mining engineers, but it is to be hoped that more attention will now be paid to it. There should, however, not only be economy in the use of wood, but great care in its selection. As to the wood best adapted for mining purposes much, of course, depends upon the nature of the mineral worked and the strata that have to be supported, and few persons unconnected with mines are aware of the cost of the timber required. The heaviest cost is in connection with coal mines, in some of which it reaches 10*d.* per ton of coal raised, so that propping and other wood form a serious annual item. Under such circumstances those who have to purchase the timber should be acquainted with its properties, more especially its durability under certain circumstances. In the horse roads and engine-planes oak and larch are often used with advantage, but these should be obtained when thoroughly dry, for dry-rot is not found in wood when perfectly free from moisture, whilst water does not produce it in wood which is always wet. The rot appears to arise from the aqueous matter in timber suffering decomposition. Temperature and ventilation also affect wood in all mines more or less. Fir wood is extensively used at many mines owing to its contraction when dry and its extent of swelling or expansion when in water. In the sinking of shafts, too, it is used with advantage, as is also rough larch for the frames and cribs. In some instances both elm and Norwegian pine are adopted with advantage, but where the pressure is very great oak is undoubtedly the best. Where there is great pressure oak is by far the best wood that can be used, and in many instances, despite its greater cost, will be found the most economical. Calling the strength of a cast-iron column 1000, the strength of Dantzie oak would be 108*s.*, and a column of red deal 78*s.* From experiments made it has also been ascertained that the strength of short columns of wet timber to resist crushing is not one-half that of columns of the same dimensions of dry timber.

Timbering in mines is a most important matter, and is capable of being carried out in a more economical manner than is usual. In sinking much timber is used at times, and frames, generally made of Scotch fir or larch, are used, being planked behind with inch deals, placed so as to nearly touch each other. The operation consists in placing two strong balks of timber upon the site of the shaft, and then the ground is dug out to a depth of 3 or 4 feet. Inch deals are set up behind the frame, the bottom ends passing down about half its thickness, so that the deals rise perpendicularly above the surface, which are kept in their place by a light frame placed within them at the top. More ground is then taken out, and another frame laid, and another set of deals put in. Another frame is placed midway between these, and a row of props between each set of frames keeps them all level, and in place. Circular cribs are frequently used, in the same manner as the frames, and these are made of timber in segments. Each segment should have a bracketed flange at the back, both at the top and bottom. Wedges made of fir are then driven into the packing, their entrance being effected by first driving in an iron wedge, so that the whole forms a firm foundation for the walling to rest upon, so that it will not give way when any part of it is undermined. For the preservation of metal tubing wood is sometimes used as a lining. It generally consists of deals, 2*in.* in thickness, bevelled to the centre of the pit by means of copper nails fastened to the tubing, the nails being driven into the plugs contained in the each segment. In propping it has been found that much of the useful effect was lost for want of proper care or knowledge on the part of the men in placing them or in constructing the frames. The ordinary plan of timbering in main ways is by props and head pieces where it has been found unnecessary to have planks passing from one side of the passages to the other. Where permanent support is necessary there should be strong walling for supporting

the planks or cross pieces. Cast metal pipes, with strong oak planks, have been found most effectual as well as economical. Where props are placed in water-courses by the side of underground passages they frequently decay, and in such cases soles of red pine or any other wood known for its durability under water should be used, and made of sufficient thickness to raise the bottom end of the prop above the ordinary level of the water. In coal mines one of the best methods adopted for supporting the roof behind the miner whilst at work, when working by the longwall system, is that of pieces of timber from 3 to 4*ft.* long built across each other by twos, and set up in double rows at convenient distances apart, the first two pieces being placed on small coal to facilitate their removal as the face advances. The strength so obtained is owing to the crushing strain being transverse to the fibres of the materials. By the use of these "chocks" greater economy of timber is effected, and the roof more securely supported than when single props only are used, and in most cases they can be recovered from the goaf, the place from which the mineral has been extracted. Where the goaf has been filled up, instead of allowing the roof to break down, a considerable saving is frequently effected in the cost for timbering, and what is known as "dead work."

Where the vein being worked is highly inclined in many cases it will be found advantageous to prepare long frames of timber at the surface before sending them into the mine, being cut the necessary lengths, and sent down in separate pieces. Those frames are fixed by wedging on each side of the ways or cross-pieces, are passed over the top from one frame to another. A good deal of the timber used in propping was to be left behind, so that cheap kinds such as alder, birch, and Scotch fir are used at many places, whilst white oak, red pine, and locust are found to be durable in underground workings. In some instances pillars of masonry are built, supporting good stout planks of oak stretching from pillar to pillar are considered the best means of support that can be devised for supporting the immediate locality of the shaft. We consider that we have shown in this comparatively brief notice the great importance to mineowners of being able to purchase timber in good condition, and also how it can be economically used. It has to be purchased in boat-loads, so that the cost must be very heavy indeed. When it is known that at some mines as much as 350,000 tons of coal are raised annually, and if in timbering only 1*d.* per ton in the yield of coal can be saved, there would be so much in the pocket of the mineowners; hence the importance of the subject we have called attention to.

## THE COPPER TRADE.

During the quarter ending March 31, 1880, the quantity of copper ore, the produce of Cornwall and Devonshire, sold at the Cornish Ticketing, was 9768 tons, which contained 662 tons 2 cwt. of fine copper, and realised 40,413*l.* 9*s.*, being equal to an average of 4*l.* 2*s.* 10*d.* per ton of ore, and 617*l.* per ton of copper in the ore. During the same period the British, colonial, and foreign ores sold at Swansea amounted to 5717 tons, which contained 515 tons 0 cwt. of fine copper, and realised 36,196*l.* 5*s.* 6*d.*, being equal to an average of 6*l.* 6*s.* 6*d.* per ton of ore, and 66*l.* 8*s.* 3*d.* per ton of copper in the ore. The average produce of the ore sold at the Cornwall Ticketings was 6*l.* 9*s.* per cent., whilst that sold at Swansea gave an average produce of 9*s.* per cent. From this it will be seen that the aggregate sales by ticket were 15,485 tons of ore, containing 1207 tons 2 cwt. of fine copper, and realising 76,609*l.* 14*s.* 6*d.* The subjoined is a summary of the periodical sales at the Cornwall and Swansea Ticketings respectively. The ores sold at the Cornwall Ticketings were—

Date.	Standard.	Prod.	Price.	Per unit.	Tons.	Fine cop.	Amount.
Jan.	1...	£99 18 0...	6 <i>l.</i> 4 <i>s.</i>	£4 1 0...	11 <i>s.</i> 1 <i>l.</i> 1 <i>2d.</i> 1/37 ...	70 <i>t.</i> 12 <i>c.</i> ...	£4,194 12 6
..	22...	105 9 0...	6 <i>l.</i> 4 <i>s.</i>	4 0 6...	12 6 ...	2,019 ... 129 9 ...	8,101 5 6
Feb.	5...	98 10 0...	7 <i>l.</i> 4 <i>s.</i>	4 18 0...	12 7 <i>s.</i> ...	1,031 ... 80 8 ...	5,060 19 6
..	19...	100 8 0...	6 <i>l.</i> 4 <i>s.</i>	4 4 0...	12 1 <i>2<i>s.</i></i> ...	2,576 ... 173 10 ...	10,334 17 0
Mar.	4...	102 17 0...	6 <i>l.</i> 4 <i>s.</i>	3 18 6...	12 1 ...	1,181 ... 75 10 ...	4,621 6 6
..	18...	101 12 0...	6 <i>l.</i> 4 <i>s.</i>	3 19 0...	11 11 ...	1,924 ... 126 18 ...	7,600 8
							Total for the quarter..... 9,768 662 2 ... £40,413 9 0
							Quarter ending December, 1879 ..... 10,586 715 6 ... 42,147 14 0
							Quarter ending September, 1879 ..... 10,235 710 7 ... 32,774 8 0
							Quarter ending June, 1879 ..... 10,675 726 16 ... 34,260 16 0
							Total for the year ..... 41,264 2814 11 ... £149,598 7 0
							Showing a quarterly average of ..... 10,316 703 18 ... 37,399 1 9
							Corresponding quarter March, 1879 ..... 10,598 731 16 ... 33,029 12 0

The ores sold at the Swansea Ticketings were—							
Date.	Standard.	Prod.	Price.	Per unit.	Tons.	Fine cop.	Amount.
Jan.	6...	£85 5 0 10 ...	£6 9 10 ...	13 0 d.	2,033 ...	203 5c.	£13,200 9 6
..	27...	92 16 6 11 <i>s.</i> ...	7 13 10 ...	13 9 <i>s.</i> ...	1,255 ...	139 17 ...	9,651 11 0
Feb.	74...	92 13 2 7 <i>s.</i> ...	4 13 11 ...	13 4 ...	1,185 ...	85 10 ...	5,567 12 6
Mar.	23...	92 7 9 9 <i>s.</i> ...	6 5 0 ...	13 4 <i>s.</i> ...	1,244 ...	116 8 ...	7,776 12 6
							Total for the quarter ..... 5,717 545 0 ... £36,196 5 6
							Quarter ending December, 1879 ..... 7,501 709 8 ... 45,390 4 6
							Quarter ending September, 1879 ..... 8,680 855 18 ... 44,807 11 6
							Quarter ending June, 1879 ..... 4,113 521 6 ... 28,261 6 6
							Total for the year ..... 26,011 2631 12 ... £154,655 8 0
							Showing a quarterly average of ..... 6,503 657 18 ... 38,663 17 0
							Corresponding quarter March, 1879 ..... 5,158 559 15 ... 28,634 8 8

## OUR RAILS IN INDIA.

It must be a matter of congratulation to the iron trade that the Finance Minister for India has recently been enabled to compile and issue to the world a balance-sheet which may fairly be termed satisfactory, since it exhibits a respectable, and, indeed, a considerable surplus. There were those who predicted that the severe military struggles in which the Government of India has been engaged would have the effect of crippling its resources, and landing it in an alarming deficit. But these prophets of evil have found their predictions signally falsified. India is a land of surprises, and the population of India appear to have been doing fairly well of late, although a war has been raging on a remote Indian frontier. Holding India as we do by the sword, we are afraid an occasional trial of strength and endurance with some native potentate is inevitable; and when once the Anglo-Indian Government is committed to such a conflict it must be brought unflinchingly to a victorious termination, otherwise we should have half India up in arms against us. Even now the pacification of Afghanistan appears to be far from complete; still we have proved our strength, and our hold upon British India has probably become a little stronger. At the same time, our administration of Indian affairs is not harsh or oppressive. We have learnt to govern India with mildness, as well as with force, if necessary; and, according to all appearances, the British rule in India never rested upon a more stable basis than it now does.

We have gone into these particulars because the credit of the Anglo-Indian Government must be intimately associated with its stability. A weak and precarious government can never have a strong credit, and the reverse holds good with reference to all solid well-established administrations. That the credit of the Anglo-Indian Government has become of a high order is at once reflected in the fact that British India can now raise all the capital of which it stands in need at 4 per cent. per annum. With an expenditure balanced by its income, with an ability to raise money at 4 per cent. per annum, and with British India in a peaceful condition, upon the whole, the Anglo-Indian Government may be fairly expected to exhibit interest and vigour in the prosecution of public works, and this being the case, the construction of more State Indian railways would under ordinary circumstances be energetically proceeded with. We say "under ordinary circumstances," but we are free to admit that the circumstances now prevailing are not exactly of an ordinary character. If the rails required for the establishment of Indian State railways were obtainable at ordinary prices there would now be no impediment in the way of a vigorous railway construction policy in British India. But it is useless to attempt to ignore the fact that steel rails are at present at a price which discourages

consumption. The tendency of prices is certainly downwards, but still the Anglo-Indian authorities are likely to pause before they buy rails very freely at present rates. But when quotations have fallen to a slightly lower level we think we may fairly assume that the Government of British India, sustained as it is by several favourable and encouraging circumstances, will be a buyer of our rails upon a somewhat liberal scale. If we are correct in this opinion our rail market may be fairly well supported, whatever course may be taken by affairs in that somewhat bewildering quarter of the world—the United States of America.

## THE LATE MR. JOHN LITTLE.

We have this week to record the death of Mr. JOHN LITTLE, of the Stock Exchange, in his 71st year. Mr. Little had not been well for some weeks, but being in the City on Thursday, March 25, he received the congratulations of many friends on his apparently improved health. Alas! on Sunday morning last he breathed his last, and was interred at Highgate Cemetery on Thursday. The nature of the disease which so instantly terminated his career was angina pectoris—a disease which may mean ossification of some portion of the heart or fatty degeneration. Mr. Little was born in the South of Scotland, near Langham. He left Scotland in early life for the sunny South, and settled in

molecular persistency. Becquerel holds that fluorescence and phosphorescence are one and the same phenomenon, the apparent differences being due solely to the different periods during which the absorbed light is emitted.

The essential feature of the invention (due to the late Professor Balmain, of University College), which is now attracting so much attention, is the combination of some of the best of these phosphorescent substances with water or oil, so that it can be applied like ordinary paint, and thus utilised in places where, in any other form, it would be quite inappreciable. In some experiments shown by Mr. King in his lecture on the subject at the Polytechnic, Regent-street, some most striking and interesting effects are produced, which can leave no doubt as to the general applicability of the invention. The owners of the patent have already received several orders from the Admiralty, &c., for framed screens—to which they give the name of Aladdin's lamps—about  $1\frac{1}{2}$  square foot surface, and which give about one-fourth the light of an ordinary Davy, the intention being, it is understood, to use them in powder magazines and similar places. The invention is one likely to come very extensively into use as soon as it merits, which are beyond question, become more generally known.

#### TECHNICAL EDUCATION IN THE UNITED STATES.

##### YALE COLLEGE.

An important step in connection with the extension of technical education has just been taken by the "President and Fellows of Yale College, in New Haven," and might be advantageously followed by some of the leading universities of this country—it is proposed to grant, after severe and continued testing by officers appointed by the university, certificates of class for instruments of precision. In the first instance arrangements have only been made in connection with the College observatory for encouraging the utmost attainable accuracy in the construction of refined apparatus for the measurement of time, but it is understood to be the intention of the corporation to extend the principle as soon as practicable to philosophical and mathematical instruments generally, and should that also prove successful to go still further. The tests are to be made at the cost of the manufacturers seeking the certificates, but as the College authorities have no desire to derive direct pecuniary advantage from the granting of these certificates little if any more than the absolute outlay involved, and hence the cost will only amount to a few shillings—an amount which most purchasers would gladly pay for the absolute guarantee of quality which such a certificate will afford. The timekeepers to be certified will be sent in much in the same way as chronometers are now sent in to the Royal Observatory at Greenwich, but the Yale authorities will give a definite and formal certificate instead of an indirect and informal one.

The Yale certificates are to consist of eight classes, and will state in detail the various tests to which the articles have been submitted and the results of the testing. Numerous costly apparatus have been provided by the College both for ensuring completeness of the test and for avoiding the possibility of any tampering. The first-class certificate will only be obtainable after protracted trials under extremes of temperature and moisture and variety of position calculated to affect the timepiece in its action, and to facilitate these tests closets have been fitted up as a refrigerator, as a chemically dried-air chamber, as an oven heated by coils of hot water pipes, and as a chamber of ordinary temperature. That such certificates will be appreciated by the public cannot be doubted, and they will thus tend more than ought else to encourage all engaged in the branch of industry affected to strain every nerve to attain perfection. At a time like the present, when we hear but too much of the decline of quality in the material and workmanship put into the articles manufactured in this country, such a step as this should attract the most serious attention, as it is only reasonable to anticipate that such a system will have an enormous effect in determining who shall command the markets of the world.

It is particularly gratifying to find that it is by one of the oldest and most celebrated universities in the Union that this important move has been made, as it affords conclusive evidence that, notwithstanding the large number of the colleges which during the present century have sprung up in every state, and thus taken academic instruction to the very doors of those who care to profit by it, the vitality and energy of the old institutions are not impaired. Yale College is one of the few American universities which can date back long before the declaration of independence—Harvard, Columbia, Princeton, and Dartmouth being the only others—and great and praiseworthy as have been the efforts of the younger colleges they have never succeeded in surpassing the older establishments. With one exception—Harvard—Yale College is the oldest university in America, and it should not be forgotten that the Sheffield Scientific School (which forms part of the College) has already done so much for the encouragement of the study of the mathematical, physical, and natural sciences, and done it so well, that the high character of every certificate emanating from the corporation is everywhere recognised. In this school the course of instruction leading to the degree of bachelor of philosophy occupies three years. The degrees of civil and dynamic engineer are given to bachelors of philosophy after a higher course of two years, and the degree of doctor of philosophy after a three years course, whilst the entire cost of tuition and lodging is considerably under 40*s*. per annum. The new bureau is the first step toward the recognition by the university of practical as well as scientific attainments, and it may fairly be anticipated that the result will be, although indirectly, alike beneficial to the College and to the people.

**THE PETROLEUM FIELDS OF RUSSIA.**—The owners of American petroleum deposits will before long have to encounter a considerable amount of opposition in view of the discoveries of this valuable oil on the Continent, and especially in Hanover and Russia. The beds in the latter country are comparatively boundless, extending for a distance of 1500 miles along the Caucasus range, from the Caspian to the Black Sea. At the present time, however, there are but two districts in this large area where any systematic efforts are being made to obtain the petroleum. One is in the valley of the Kuban river (which flows into the Black Sea), where two wells have been sunk by a French company under the superintendence of an American manager; this company has a refinery at Taman. The other and most productive district is near Baku, on the Caspian Sea. Many wells have been sunk here to the depth of 300 ft., having a daily yield of 28,000 barrels of crude petroleum. An extraordinary amount of sand flows out with the oil, and is heaped up near the orifice of the wells in banks at least 30 ft. high. Large refineries exist at Baku, though the refined oil at present produced there is not so good as the American oil.

**IMPROVED ARC FOR THE HEDLEY DIAL.**—An ingenious and important attachment to the Hedley dial has been applied by Messrs. John Davis and Son, the well-known mathematical instrument makers of Derby, and will doubtless be appreciated and adopted by surveyors generally. It consists of a new form of arc of such a size and so fixed that it may be read with ease, and is never in danger or in the line of vision in reading the dial, we have now the pleasure to describe. In the place of the old arc a circular box is fixed of only  $1\frac{1}{4}$  in. in diameter, containing a dial divided into 50 equal parts and figured both ways  $10^\circ$ ,  $20^\circ$ , up to  $50^\circ$ , by rack and pinion motion a hand traverses over the dial one whole revolution for a dip of  $50^\circ$ . With this small arc, which is well protected and very compact, a scale of degrees twice as open as of the old form is obtained. The new arc can be applied to existing dials at a merely nominal cost.

**ELIMINATION OF PHOSPHORUS FROM IRON &c.**—Mr. JULIEN DEBY, of Brussels, provisionally protected but did not complete a patent for an invention relating to the elimination, partially or wholly, of phosphorus or its combinations or compounds from iron, other metals, and their alloys, through the action upon them while in a molten state of gases which are blown through them while held in a Bessemer converter, blast or other furnace, receiver or cupola. The gases specially referred to comprise such only as have a definite reducing action on the combinations or compounds of phosphorus in

contradistinction to such other gases as have an oxidising action similar to atmospheric air applied in blast. And the invention consists in temporarily substituting for the atmospheric blast now in use, in order to eliminate the phosphorus from the molten metals, a blast containing carbonic oxide, ammoniacal vapours, or some other reducing gas manufactured specially, or to be obtained from waste products, of a liquid or volatile nature, such as result from the treatment of ores or metals, or the manufacture of coal gas or other industries.

#### PROVINCIAL STOCK AND SHARE MARKETS.

**CORNISH MINE SHARE MARKET.**—Mr. S. J. DAVEY, mine shareholder, Truro (April 1), writes:—A large business has been done in our market during the week. Prices recovered from the fall of a few days before, but do not close at their best. The tin standards have fallen 3*s*. Carn Brea shares advanced 8*s*. Dolcoath 5*s*. East Pool 6*s*. South Frances 2*s*. Tincroft 3*s*. West Bassett 30*s*. West Frances 3*s*. Wheal Peevor 20*s*. The following are to-day's prices:—Blue Hills, 3*s*  $\frac{1}{2}$  to 4*s*; Carn Brea, 8*s* to 8*s*; Cook's Kitchen, 6*s* to 6*s*; Dolcoath, 5*s* to 5*s*; East Pool, 3*s*  $\frac{1}{2}$  to 3*s*; Mellanear, 5*s* to 5*s*; New Cook's Kitchen, 6*s* to 7*s*; North Busy, 1*s* to 1*s*; Penhalls, 2*s*  $\frac{1}{2}$  to 3*s*; Poldice, 2*s* to 2*s*; South Conduffor, 11*s* to 12*s*; South Crofty, 11*s* to 12*s*; South Frances, 15*s* to 16*s*; West Bassett, 18*s* to 18*s*; West Frances, 15*s* to 16*s*; West Peevor, 7*s* to 8*s*; West Seton, 23*s* to 27*s*; West Tolgus, 50 to 55*s*; Wheal Agar, 6*s* to 7*s*; Wheal Bassett, 3*s* to 4*s*; Wheal Grenville, 8*s* to 9*s*; Wheal Kitty, 5*s* to 6*s*; Wheal Prussia, 2*s* to 2*s*; Wheal Peevor, 27 to 28*s*; Wheal Uny, 4*s* to 5*s*.

—Mr. JOHN CARTER, mine shareholder, Camborne (April 1), writes:—The Cornish mine share market has been a little more active during the week; prices have had a rapid rise, and more business transacted. On the announcement of the Banca sale, on March 31, and the fall of 3*s*. in the tin standards, prices again gave way, but are to-day steady at annexed quotations:—Blue Hills, 4*s* to 4*s*; Carn Brea, 8*s* to 8*s*; Cook's Kitchen, 6*s* to 6*s*; Dolcoath, 5*s* to 5*s*; East Pool, 3*s*  $\frac{1}{2}$  to 3*s*; Killifreth, 1*s* to 1*s*; Mellanear, 5*s* to 5*s*; North Busy, 1*s* to 1*s*; Penhalls, 2*s*  $\frac{1}{2}$  to 3*s*; Pedn-an-drea, 15*s* to 17*s*; Pendavil United, 8*s* to 9*s*; Poldice, 2*s*  $\frac{1}{2}$  to 3*s*; South Conduffor, 11*s* to 11*s*; South Crofty, 11*s* to 12*s*; South Frances, 17 to 17*s*; Tincroft, 19*s* to 20*s*; West Bassett, 17*s* to 18*s*; West Frances, 15*s* to 16*s*; West Peevor, 7*s* to 7*s*; West Seton, 23*s* to 25*s*; West Tolgus, 50 to 52*s*; West Poldice, 2*s* to 2*s*; Wheal Agar, 6*s* to 6*s*; Wheal Bassett, 4*s* to 4*s*; Wheal Grenville, 8*s* to 9*s*; Wheal Jane, 4*s* to 4*s*; Wheal Kitty, 5*s* to 5*s*; Wheal Peevor, 27 to 28*s*; Wheal Uny, 4*s* to 5*s*.

—Mr. M. W. BAWDEN, Liskeard (April 1), writes:—The mining market, especially for tin stock, has considerably improved, and most shares have advanced in price, but to-day the market is easier, the subjoined being the closing prices:—Bedford United, 7*s* to 8*s*; Carn Brea, 8*s* to 8*s*; Clitters, 4*s* to 5*s*; Cook's Kitchen, 6*s* to 6*s*; Dolcoath, 5*s* to 5*s*; East Pool, 3*s*  $\frac{1}{2}$  to 3*s*; Devon Consols, 12*s* to 12*s*; East Caradon, 3*s* to 3*s*; East Pool, 32 to 33*s*; Gawton, 1*s* to 1*s*; Glasgow Caradon, 1*s* to 1*s*; Herdfoot, 4*s* to 4*s*; Hindston Down, 1*s* to 1*s*; Marke Valley, 1*s* to 2*s*; Phoenix, 5*s* to 5*s*; Prince of Wales, 5*s* to 5*s*; South Caradon, 12*s* to 13*s*; South Crofty, 13*s* to 14*s*; South Frances, 16*s* to 16*s*; Tincroft, 18*s* to 19*s*; West Bassett, 17*s* to 18*s*; West Mary Ann, 1*s* to 1*s*; West Phoenix, 2*s* to 2*s*; Wheal Agar, 7*s* to 7*s*; Wheal Crebore, 4*s* to 4*s*; Wheal Grenville, 8*s* to 9*s*; Wheal Peevor, 27 to 28*s*; Wheal Uny, 4*s* to 5*s*.

**MANCHESTER.**—Messrs. JOSEPH R. and W. P. BAUNES, sharebrokers, Queen's Chambers, Market-street, Manchester (April 1), write.—The Easter holidays have curtailed the time of business during the past week, and this, together with the settlement of the account and the unprecedented excitement consequent on the elections in this neighbourhood, render a report of business almost impossible, inasmuch as there is hardly any business to report upon. Political feeling runs very high in this locality, and business is nearly at a standstill during the time the contests are in progress.

**BANKS** are unchanged in quotations. Insurance shares have varied somewhat. Thame and Mersey have risen  $\frac{1}{2}$ %, whilst Manchester and London Fire are  $\frac{1}{2}$ % and Lancashire Insurance and Lancashire and Yorkshire Accident  $\frac{1}{2}$ % each lower.

**COAL, IRON, &c., AND MINING.**—These shares have moved to a very trifling extent, the only changes being Bolckow, A (fully paid) 5*s*; ditto A (6*s*. paid), 3*s*; and ditto B, 1*s*; Cammell  $\frac{1}{2}$  and Chillington  $\frac{1}{2}$  lower; Canadian Copper, 5*s*; Elbow Vale,  $\frac{1}{2}$ %; and Tharsis Sulphur,  $\frac{1}{2}$  higher.

**COTTON-SPINNING AND MANUFACTURING.**—The results that up to the present have come out are highly satisfactory, and prices generally continue to harden, but only few are known much yet. Doubtless during the next few days a great many will be announced, and they will no doubt harden the prices further.

**GAS AND WATER ANNUITIES AND CORPORATION STOCK** show no change.

**MISCELLANEOUS COMPANIES** show no feature. Manchester Carriage are  $\frac{1}{2}$  higher, and Bridgewater Navigation 1*s* lower.

**RAILWAYS.**—The holidays have to a great extent interfered with business; prices, however, were good until Wednesday, when Easter traffic returns not showing up to expectation caused a decline in value, the heavy lines suffering—more particularly the Great Northern A. North British were firm on the meeting, relapsing with others in sympathy. Movements have been chiefly confined to Canadians, the traffic receipts coming up well, and giving confidence to those who expect full dividends on the Trunk first and second preference next half-year. These have risen 4 and 5 per cent. respectively, the whole tone being firm. Atlantic issues have come into request the last few days, and close this evening with an upward tendency.

**HULL.**—Mr. W. F. SUTTON, stock and share broker, St. Mary's Chambers (April 1), writes:—Despite the political excitement and uncertainty the railway markets have shown strong vitality, and all quotations rule higher than a week ago. Notwithstanding some weakness to-day on the unfavourable change in the weather, and possibly in some measure to the elections so far having gone against the late Government, the belief of the Stock Exchange, it is said, being that more help will be given to markets through the existence of a Conservative administration than through the advent of power of the Liberals. This opinion may be open to question, but the tone of the continental press generally most certainly goes to prove that this view is correct. Should, however, traffics continue good there is not much to fear for the immediate future of British railways. The traffics of the Canadian lines this week are again eminently satisfactory, and the want of faith in their future so largely prevalent some little time ago appears to be rapidly disappearing. In view of the continued improvement of trade it is to be wondered that more attention is not given to telegraph cable stocks. The companies are building up large reserve funds, and enhancement of dividends cannot be far distant. Local stocks quietly steady. We quote Hull Banks, 11*s* to 12*s*; 3*s*. paid; Yorkshire Banks, 28 to 29*s*; London and Yorkshire Banks, 27*s*. to 28*s*. 6*s*. paid; Hull Trams, 10*s* to 11*s*; Earle's Shipbuilding, 17*s* to 18*s* (35*s*. paid); British Gas, 34 to 34*s*; Hull Docks, 9*s* to 9*s*; ditto, 4 per cent. Debenture Stock, 9*s* to 10*s*; and Hindston Cotton Mill, 10 per cent. pref. (7*s*. paid), 6*s* to 7*s*.

#### SCOTCH MINING AND INDUSTRIAL COMPANIES' SHARE MARKETS.

**STIRLING.**—Mr. J. GRANT MACLEAN, sharebroker and ironbroker (April 1), writes:—During the past week the Easter holidays intervening have restricted business, but the commencement of the account for the settlement, April 15, has been marked by a renewal of the upward movement in prices and increased business. The fine weather we have experienced encourages hopes of better agricultural prospects this year and a continuance of the revival in trade. Speculative transactions appear to have been much reduced at last settlement, and this, along with an easier money market, encourages purchasers. If the metal markets improve, there is every reason to expect another run on mining shares.

In shares of coal and iron companies the movements for the week comprise advances of 10*s*. per share on Steel Company of Scotland; 4*s*. 6*s*. on Clyde Coal; 1*s*. on Benhar, also Omoea and Cleland; and 1*s*. 6*s*. on Monklands; but Chillington Iron are reduced 10*s*. per share; Benhar have improved from 4*s*. to 5*s*. 6*s*. The Pig Iron Market has been firmer, from 5*s*. to 5*s*. 9*s*. The low prices are beginning to attract investors, and there is not much iron on sale; so when a quantity is wanted it is difficult to obtain unless at increased prices, which shows that the bears have sold as much as they care about. It is possible there may not be much improvement for some time yet; but there will likely be occasional spurs, as the stock is decreasing, although the make is increased. Newport Abercarn Coal shares are considered worth buying, as the company started the year with a balance of profit of over 400*s*. which, with the current year's profit, should enable a good dividend to be paid. Andrew Knowles and Sons are at 8*s*. 6*s*; Bilbo Iron, 29*s*; Bolckow, Vaughan, and Co., 8*s* to 8*s*; ditto, B, 4*s* to 4*s*; ditto, stock, 15*s*, all ex div.; Cardiff and Swansea, 6*s*; Charles Cammell and Co., 4*s*. 6*s*.; Chillington Iron, 8*s*; 6*s*; Clyde Coal, 7*s*. 6*s*; Elbow Vale, 9*s* to 10*s*; Great Western Colliery, B, 8*s*; Henry Briggs, 6*s*; John Bagnall and Sons, B, 20*s*, to 25*s*; Lydney and Wigpool, 15*s*; Monkland Iron and Coal, 6*s*; 6*s*; ditto, pref., 6*s*; Marbella Iron, 7*s*; Nerbudda Coal and Iron, 7*s*. 6*s*. to 10*s*; Omoea and Cleland Coal and Iron, 3*s*. to 3*s*.; Parkgate, 14 per cent. Rhymney Coal, 25*s*; Scottish Australian Iron, 40*s*. to 45*s*; Shott's Iron, 3*s*. 6*s*; Southwall Colliery, 9*s*. 6*s*. Steel Company of Scotland, 11*s*; ditto, new, 5*s* to 6*s*; Thorp's Gawber Hall, 7*s*. 6*s*; ditto, pref., 9*s*.

In shares of foreign, upper and lead companies business has been more active. Tharsis have declined 1*s*. per share; Rio Tinto shares 10*s*.; ditto, 7 per cent., 6*s*. 3*s*.; and Canadian, 6*s*. The Virneberg return for last week has been 23 tons good percentage copper ore. The West Prussia Mining Company has declared an interim dividend on the A shares at the rate of 4 per cent. Tharsis opened lower, 29*s*, but have steadily improved to 31*s*; Copiapo, 12*s*; Hultafall, 3*s*.; New Quebrada, 7*s*. 6*s*.; Panuelillo, 9*s*. 6*s*. Rio Tinto, 5*s* per cent., 9*s*. 2*s*. The Argentine Peninsula, 6*s*. 3*s*. to 8*s*. 9*s*.; ditto, pref., 22*s*. 6*s*. to 25*s*.

In shares of home mines there has been more business doing, tin shares being in especial demand. An inflation of prices of mining shares is likely to set in again, and as some of the mines are nearly worked out investors will require to watch their opportunity for realising. The reports from East Chilcotin state that the stope in the 74 have again improved, and the lode in the 90 is looking as if the ore would soon be cut into. The ore ground is making east as well as west, so that will be run sooner than at the 70. Glasgow Caradon shares have been steady at 27*s*. 6*s*. to 28*s*. 6*s*.; but the new shares are 1*s*. lower. The quotations for Wheal Crebore, 8*s*. to 8*s*. 6*s*. is not much lower, being for the divided shares. Aberdare are at 2*s*; Berchelyn, 7*s*; Betws-y-coed, 15*s*. to 12*s*; Carn Brea, 8*s*; Dolcoath, 5*s*; Derwent, 7*s*; East Caradon, 7*s*.; East Pool, 3*s*; East Roman Gravels, 12*s*. 6*s*.; Glenroy, 25*s*; Great Laxey, 18*s*; Gunnislake (Clitters), 5*s*; Hindston Down, 17*s*. 6*s*.; Killaloe slate, 1*s*. 3*s*.; Lady Bertha, 5*s*; Marks Valley, 4*s*.; Mining of Ireland, 6*s*.

Norway, and at the Wyandotte Works, in Michigan, are described and commented upon. In the second, silver smelting in England, at Freiberg, and in Japan are in turn described; and in the third there are very full descriptions of the various processes in use in Mexico and elsewhere. By way of appendix, there is a note by Prof. Liveridge, of Sydney University, on the occurrence of silver ores in New South Wales; notes on silver and mercury, silver and platinum, silver and tin, and silver and cadmium; a note from Dr. Sterry Hunt on Silver Islet; and a note on the liquation of hard lead, correcting an error in the volume on the Metallurgy of Lead, published in 1870. The specimen described therein, at p. 467, as the product of liquation, was obtained not by that process but by smelting hard lead and various residual substances containing lead in admixture with poor coppery regulus, in order to separate copper from hard lead. The value of the volume is enhanced by the excellent index which it contains, and which renders every statement in the book readily accessible, whether the reader knows only whose opinion upon a given subject he desires to obtain or what particular point he seeks information upon. A more exhaustive work upon the subject need not be desired.

With regard to the thoroughly practical and utilitarian character of the information contained in the volume, it can be most readily judged of by considering the character of the author, and this cannot be better or more concisely expressed than has been done in the *Athenaeum*. Dr. Percy is an eminent example of the best kind of technical instructor. He was trained in a school of exact science. Originally he distinguished himself as a physician and an experimental physiologist; but during his residence in Birmingham he became attached to the pursuit of metallurgical enquiry; and on the opening of the Museum of Practical Geology in 1851 he did not hesitate to abandon a prominent position in the medical profession in order to follow the bent of his inclinations in organising and teaching metallurgy. Up to the present time his class has been the only one in this country devoted to adequate metallurgical enquiry. For nearly thirty years Dr. Percy has pursued his career in the laboratory, making the most exhaustive analytical investigations. Session after session he has delivered not merely stereotyped courses of lectures, but lectures imparting new knowledge, the result of his constant and systematic studies. He has thus trained as eminent a body of specialists as have ever been produced in any school in any country. There is abundant evidence of this in the volume before us, and in the names of his friends and coadjutors, Snelus, Roberts, Tooley, Dick, Weston, and others, all old pupils, whose assistance in this volume has been most fully acknowledged. But what has been his reward? It is with shame and indignation that in the preface to this volume will be read Dr. Percy's remarks on his resignation of his position as Lecturer on Metallurgy in the Royal School of Mines. He rejoices in a freedom which places more time at his disposal, and he hopes speedily to complete his task. But he betrays the pang which this separation occasions him. Such a man should never have been subjected to the necessity of resigning a position which he had made especially his own. Consolation may, however, be found in the certainty of its being universally felt, if not openly said, that a serious mistake has been made, and that the Department of Science and Art has dealt a severe blow to technical teaching in this country.

## SOUND INVESTMENTS.

**GRAND TRUNK RAILWAY OF CANADA.**—Those who have been the most sceptical as to the future of this railway are now among the strongest believers in it. There is ample foundation for their confidence. The traffic receipts are beginning to derive some benefit from the opening of the line to Chicago, and there is no doubt that each week will show larger and still larger increases than those to which we have recently been accustomed. As compared with the previous year, the receipts for the last two weeks show increases of 10,870<sup>l.</sup> and 12,923<sup>l.</sup>, or 34<sup>1</sup>/<sub>2</sub> per cent. and 42<sup>1</sup>/<sub>2</sub> per cent. respectively. No railway in Europe can show such progress. It is almost certain that this year the First and Second Preferences will receive their 5 per cent. interest in full, and it is, therefore, surprising that with the dearth of good investments the First Preferences can be bought to yield 6<sup>1</sup>/<sub>2</sub> 8s. 4d. per cent. There is the prospect not only of income, but also of considerable improvement in capital value.

Totally apart from the intrinsic merits of the railway, there is a contingency which should be steadily kept in view—the probability that the Dominion Government may desire to become possessed of this railway, which is now really what its name implies, the Grand Trunk of Canada.

The Government of Canada have 3,111,500<sup>l.</sup> already invested in this railway, which does not rank for dividend until the ordinary stock has received 6 per cent., and added to this their possession of the Intercolonial Railway, their purchase of the Rivière du Loup line from the Grand Trunk, and their construction of the Canadian Pacific Railway for opening up the western districts of Canada, all tend to show their desire to acquire the railways. India has made a beginning by the purchase of the East Indian Railway, and in the case of our other colonies, Australia, New Zealand, and the Cape, the railways are the absolute property of the Governments.

The present moment would be a favourable one for the Government, but hardly so for the shareholders, as the prospects of the Grand Trunk itself were never brighter. Delay is all in favour of the latter, as experience has shown in the acquisition of the telegraphs and the proposed acquisition of the water companies by the English Government, in both of which instances not only present but prospective values have been demanded. The Dominion Government would have no difficulty in raising a loan at 4 per cent. for purchasing the railways. Presuming that the 5 per cent. debenture stock would remain a first charge upon the property, the Government would only have to deal with the preference and ordinary shareholders. No doubt, if an arrangement could be arrived at before the close of this year, the first preferences might be obtained at 100, the second preference at 90, the third preference at 70, and the ordinary stock at 50. These prices are by no means extravagant, seeing that not many years ago such quotations were current when the position and prospects of the railway were nothing like so brilliant as they are to-day.

**LONDON, CHATHAM, AND DOVER RAILWAY.**—Shareholders are to be congratulated on the fact that at last the strong position which is occupied by this company is attracting the attention of a new class of investors. Those who have held on in faith for so many years are not likely to sell now, when such bright prospects are opening out. It will be remembered that when, by the aid of the proprietors, I upset the fusion scheme with the South-Eastern, it was estimated that the progress of the Chatham would have been in the proportion of 31 per cent., as compared with 69 per cent. of the South-Eastern. The growth of the Chatham, however, has been largely in excess of these estimates, and I think shareholders may fairly review their position to-day with strengthened hopes.

Apart from the steady development which is going on all over the system, I have persistently laid the greatest stress upon the importance of the connection which this company enjoys with the Metropolitan and Northern lines, by its extension across the Thames from Blackfriars, *via* Ludgate to King's Cross. This section of the line runs through the very centre of the new Fruit and Vegetable Market, the foundation stone of which was laid last month. It is almost impossible to over estimate the benefits which this market will bring to the Chatham Company, as it will practically enjoy the command of the traffic in fruits and vegetables with Kent, "the garden of England," and the Continent.

In order to demonstrate to shareholders at a distance the value of these connections to which I have so frequently referred, I issue with this circular a map, showing the lines within the City of London, and the position of the new City Markets which they intersect.

The Preference Stock, yielding 4 per cent. to a present investor, with a prospect of 4<sup>1</sup>/<sub>2</sub> per cent. at an early date, is one of the cheapest dividend-paying English Railway Securities to be found. The Ordin-

nary Stock must of course be regarded as a speculative investment to lock up for the future.

**METROPOLITAN DISTRICT RAILWAY.**—It is not many years since I recommended the purchase of this stock at 22. The price now is 82, and to those who can afford to invest regardless of immediate dividend the quotation is by no means extravagant, considering the prospects of the line. The Metropolitan lost a great chance when they refused to amalgamate with the District upon the terms proposed of giving 50<sup>l.</sup> of Metropolitan for 100<sup>l.</sup> of District stock. The day may not be far distant when they will be glad to amalgamate upon equal terms. Such an opinion may now appear to some to be quite as wild as many regarded the recommendation to buy District stock at 22.

**ATLANTIC, MISSISSIPPI, AND OHIO RAILWAY.**—The improvement in this railway is very remarkable. The official report of the working for the month of January shows that the net receipts amounted to \$84,295, against \$28,705 in January, 1879, the increase being \$55,590, or no less than 193 per cent. Negotiations are now taking place between the English and Dutch committees, with a view to their deciding upon an united course of action in the interests of the bondholders.

**MEXICAN RAILWAY.**—The steady growth of the traffics on this railway continues, and the various securities from the 6 per cent. debentures to the ordinary shares are decidedly attractive investments. The buying of the debenture bonds in the market by the company out of the subvention money received from the Mexican Government will, no doubt, commence immediately, and these continuous purchases must have the effect of improving the value of the stock.

**SOUTH INDIAN GOLD MINES.**—The almost unparalleled success which attended the introduction of the South Indian and Indian Glenrock Gold Companies has naturally brought to the surface a multitude of gold mining projects from all quarters of the globe, but the bulk of them, if not all, appear to have received very little support from the public, as those who have hitherto been in the habit of investing in mines have learnt by bitter experience to become discriminating, and the properties which have been offered for subscription lack one very important feature which distinguished both the South Indian and Indian Glenrock Companies—the Government brand as to their merits.

The report of the Indian Government upon the gold mines of Southern India, just issued, is of deep interest to all present holders or intending investors in the shares of these two companies, and I should advise each one to obtain for himself a copy of the Parliamentary Blue-book, as the perusal of this official document must be convincing as to the intrinsic merits of both undertakings.

The mere butterfly speculators who applied for shares simply to sell at a premium have evidently been entirely cleared off the market, which is consequently in a much more healthy condition. The fully-paid shares of the South Indian and Glenrock Companies can now be bought at 27, respectively, and upon such a report from Government they must advance considerably.

**CANADIAN COPPER AND SULPHUR COMPANY.**—A meeting has been called for the 15th inst., for the purpose of raising a small amount of debenture stock to enable the directors to develop and work more vigorously the various valuable properties for the benefit of the shareholders, or to grant leases of a portion thereof to responsible persons on very favourable terms. I am assured upon good authority that this company can produce refined copper of the best quality at 50<sup>l.</sup> per ton net. The lowest prices touched for this class of copper during the recent depression was 65<sup>l.</sup> per ton; its present value here is 75<sup>l.</sup> per ton, while owing to the protective duties in Canada the last sales there realised 86<sup>l.</sup> per ton net.

In view of the important discovery upon the Acton Estate, and the circumstances narrated above, the forthcoming meeting will be one of special interest to the proprietors, and I have very little doubt that when the position and prospects of the company are made known the 4<sup>1</sup>/<sub>2</sub> fully paid shares will advance in value. They are now quoted at 21. 15s. to 22. 17s. 6d.

**TRAMWAYS.**—The traffic returns are improving, and as the summer advances even better results may be expected. The popularity with which tramway securities were at one time regarded will slowly, but surely, return to them, as they are a class of investment which everyone can understand. Balance-sheets are issued regularly every half-year showing the exact position of the undertakings, and shareholders can themselves personally inspect their properties. It is surprising that there should exist a class of small investors, who, having once made the mistake of entrusting their savings to such impudent Governments as Turkey, Peru, Honduras, San Domingo, Paraguay, &c., should still cling to these bonds, in the hope of "something turning up" to benefit them, while they could employ their dormant money in such home securities as tramways, which, even in bad times like those through which we have recently passed, have paid a fair rate of interest. Dividends will, no doubt, increase this half-year, thus tending to the improvement in capital values.

**DUBLIN TRAMWAYS.**—At last the directors of the various companies in this city, which is so admirably adapted for tramways, have in the interest of their proprietors entered into a preliminary agreement which will, no doubt, culminate in amalgamation. The shareholders of all the companies will, as a matter of course, agree to the proposal to exchange their shares for those in the Dublin United Tramways Company. All who, like myself, are well acquainted with the tramways in Dublin must have been impressed with the fact that in working four distinct companies like the Dublin, Dublin Central, North Dublin, and Dublin Southern District (the latter owned by the Imperial Company), there must have been an amount of waste in administration, servants, horses and vehicles, which would, of itself, have been sufficient to pay a dividend on the total capital. Happily for the shareholders, and equally fortunate for the inhabitants of Dublin, who are nearly all tramway travellers, there is not the slightest fear as to the success of the scheme. The recent advance in the prices of the various shares is in anticipation of it, and any opposition to the carrying of a measure which is so manifestly to the interest of all concerned will be certain of complete annihilation. I feel sure that the shares of the new company, when launched, will command a good premium.

**IMPERIAL TRAMWAYS.**—I am pleased to be able to state that the prospects of this company are decidedly brightening. The Dublin Southern line will, under the new tramway combination in that city, now have a chance of development which has hitherto been denied to it. Another favourable feature is the permission granted by Parliament for the conveyance of passengers on the Corris line, where steam power is used.

**BORDEAUX TRAMWAYS AND OMNIBUS COMPANY.**—It was fully expected that the first six miles of this tramway system would have been opened in time for the Easter traffic, but it was found impossible to accomplish this. Nevertheless, the returns from the omnibus service alone for the four weeks ending March 26, amounted to no less than 46,977<sup>l.</sup>, or an average of 1,174<sup>l.</sup> per week. This company has already hand the revenue from Nov. 1 last, so that when the accounts are made up to June 30 there will be eight months' profits to distribute, derived from eight months of omnibus traffic and three months of partial tramway traffic. In the course of the next few months there is every probability of these shares being quoted at a considerable premium. Tramways Union 5<sup>l.</sup> shares, for instance, are at 7<sup>l.</sup> (and they are well worth it), equal to 14<sup>l.</sup> for a 10<sup>l.</sup> share. There is every reason why the Bordeaux shares should be equally valuable.

I am so confident that when the tramway lines are opened the Bordeaux Company will be one of the best paying systems on the Continent that I have secured the balance of unallotted shares in the hands of the Tramways and General Works Company, except those reserved for issue in Bordeaux, and I am now prepared to receive applications for the same at the price of £10 10s. per share, to be placed in the buyer's name free of all expenses, and with this circular I enclose a Form of Application, which, if signed and returned to me, shall be considered in the order of receipt.

—From Mr. W.M. ABBOTT'S Circular for April, Tokenhouse Yard, London, E.C.

**SATURN.**—The trustees have issued a circular to the debenture holders stating that the expectations as to deriving permanent income from leasing Sandy Land furnaces were not realised, and,

owing to the improvements introduced in furnaces, those of the trust were comparatively worthless. The title to the mines was too insecure to justify expenditure, but a United States patent has now been obtained, and it is considered that the general improvement in the prospects of Utah mining generally gives hopes of the satisfactory development both of the mine and of the Sandy property.

**LINARES.**—The directors' report, to be submitted to the meeting on Thursday, states that the profit for the half-year ended Dec. 31 was 65,737<sup>l.</sup> 6s. 11d., which favourable result was in part derived from the improved price of lead in the last three months of the half-year, and also from the increased quantity of ore extracted from the mines. The reserves are, nevertheless, 700 tons larger. The Quintientes Mine has maintained its position during the half-year, and has yielded a portion of explorations. The levels in this mine are poor at present, but they show indications of improvement. The lead market has fluctuated considerably since the last general meeting, prices having been at one time more than 4<sup>1</sup>/<sub>2</sub> per ton higher than they were in September last. A portion of this advance has since been lost, but prices are still such as to yield good profits to this company, seeing that its mines are so productive and are cheaply worked. The balance standing to the credit of profit and loss account on Dec. 31 amounted to 66,347<sup>l.</sup> 18s. 1d., out of which the directors declared a dividend of 8s. per share, payable this day, 5,999<sup>l.</sup> 4s., and placed to the credit of the reserve fund 400<sup>l.</sup> = 63,997<sup>l.</sup> 4s., leaving a balance to carry forward of 235<sup>l.</sup> 12s. 1d.

**FORTUNA.**—The directors' report, to be submitted at the meeting on Thursday, states that the profit on the six months to Dec. 31 was 67,437<sup>l.</sup> 15s., which has enabled the directors to pay an increase dividend (5s. per share), and carry 500<sup>l.</sup> to the reserve fund. At Canada Incosa Mine the operations on the south lode have been attended with favourable results, and San Pedro shaft, which is situated on this lode, is about to be sunk to a new level. On the old lode the 100' east of Lowndes' shaft, and the 120' west of O'Shea's shaft, have each been opened out productively. At Salidos Mine the sinking of the main shaft has recently been completed to the 175'. In the sinking of this shaft the lode was generally productive, and was valued at one time as high as 4 tons of ore per fathom. Judging from this and from the fact that the lode in the upper levels has been rich, there is great probability that the 175' will open out a valuable run of ore ground. The new mines acquired have not all been settled for as yet, but the directors are able to report that the total purchase-money, including the 1112<sup>l.</sup> 2s. 1d. charged in the balance-sheet, will amount to about 23,000<sup>l.</sup> The working cost in connection with these mines up to the end of December, as will be seen from the balance-sheet, amounted to 13,857<sup>l.</sup> 8s. 2d., so that the total outlay on the new mine to that date has been about 42,857<sup>l.</sup> out of 50,000<sup>l.</sup> set aside for them out of the reserved fund. To provide funds for their further development up to the next half-yearly general meeting, the directors estimate that an additional grant of 30,000<sup>l.</sup> from the reserved fund will be necessary. It is hoped that these new mines will be brought into a profitable state by the aid of the reserved fund, without trenching on the dividends of the shareholders.

**ALAMILLOS.**—The directors' report, to be submitted at the meeting on Thursday, states that the result of the past six months' working, has enabled the directors to pay a dividend of 1s. per share. The profit of 25,377<sup>l.</sup> 8s. 4d. shows a large increase on that of the previous six months, which arises from the improved price of lead and the increased extraction of ore from the mines. The increase in the raisings has been mainly obtained from portions of the mines previously unworked which has been let to miners for short periods on contract, paying them so much per ton for the ore they raise. This system has so far proved advantageous to the company, and it is hoped that important discoveries of ore will result from it. The exploratory works continue to be actively carried on. The lode in the different levels has fluctuated in value; it is, however, satisfactory to find that after raising 13,68 tons of ore the reserves are not less than they were six months ago, being again estimated at 25,000 tons. There is no feature to comment on in regard to the smelting and the transport; both have been conducted with the usual regularity. The profit on six months to date was 25,377<sup>l.</sup> 8s. 4d.; less balance of 1,612<sup>l.</sup> 1s. per share, payable this day, 17,500<sup>l.</sup>; carried to reserve fund, 30,000<sup>l.</sup>: leaving balance to carry forward, 281<sup>l.</sup> 7s. 7d.

**LONDON AND CALIFORNIA.**—The report to be presented at the meeting on Thursday states that the amount now standing to the credit of profit and loss is 19,337<sup>l.</sup> 7s. 11d., which the directors recommend be carried forward as usual. The sum brought into the account was 24,078<sup>l.</sup> 12s. 10d., which has been reduced by 4,741<sup>l.</sup> 4s. 11d. expended in the development of the new property, the erection of hoisting works there, and in prospecting the Original Amador, which produced in the half-year 2,929 tons of ore, of which 2,923 tons yielded in the mill £32,982 67, or an average of 811 28 per ton. The development of the new property has been proceeded with as rapidly as circumstances would admit. In the Maryland Tunnel there were some detached bunches of quartz found, but no continuous bodies of ore. In the Seaton Tunnel some small bodies of excellent ore were found, which Mr. Johns hopes will lead to much larger bodies in depth. The new shaft has now been completed to the tunnel, about 170 ft. from the surface. The directors must express their regret that the explorations during the half-year have not developed anything of value in the east shaft of the Original Amador. The stopes in the upper part of the mine, though now getting poor, have held out better than was anticipated, and have been the means of furnishing funds for the development of the new properties. To them the directors can turn in a more hopeful spirit. Mr. Johns' report shows that ore does exist in the Seaton, and a strong vein is observable going down, while the general opinion on the other side is favourable to the future prospects of this mine.

**SIERRA BUTTES.**—The report to be presented at the meeting on Thursday states that the net profit of the half-year amounted to 69,257<sup>l.</sup> 0s. 9d., of which the sum of 500<sup>l.</sup> has been applied to reduce cost of the Independence Mine and Water Rights. Out of the remaining balance at disposal the directors recommend that a dividend of 1s. per share, free of income tax, amounting to 61,257<sup>l.</sup>, be declared at the forthcoming general meeting; the amount to be carried forward to the next account will then stand at 96,677<sup>l.</sup> 8s. 8d. The mine produced during the half-year 33,101 tons of ore, at an average cost of 83 74<sup>1</sup>/<sub>2</sub> per ton; and of this quantity the ore was crushed 32,903 tons, at an average cost of 80 61<sup>1</sup>/<sub>2</sub>, which gives a total cost of 83 63<sup>1</sup>/<sub>2</sub> per ton, against 83 84 in the previous half-year, thus showing a slight decrease in the average working expenses. The yield of the ore in free gold was 84 52, and with that obtained from the tailings 84 94 per ton, against 85 88 in the previous six months. This decrease in the yield as compared with the previous half-year was caused by the sudden falling off in the value of the stopes, principally during October and November. They expended £23,055 in prospecting, and although the results are rather discouraging, Mr. Johns has strong hopes that ore bodies will be opened in the seventh level during the coming half-year. Though the half-year's operations have not been so satisfactory as could have been wished, and the stopes now being worked do not appear to promise much immediate improvement, yet Mr. Johns is hopeful of profitable improvements in the seventh and eighth levels.

[For remainder of Meetings see this day's Supplement.]

### LEAD ORES.

Date.	Mines.	Tons.	Price per ton.	Purchasers.
Mar. 30—Pandora	...	20	£10 1 0	Sheldon, Bush, and Co.
April 1—Van	100	11 15 0	...	Panther Lead Co.
—ditto				

**MINE "EL CALAO,"**  
GUAYANA, VENEZUELA.  
COUPONS OF SHARES ..... 322  
GOLD IN BARS.—Produce in the month of January, 1880, remitted Ozs. to Messrs. Baring Brothers and Co. ..... 3337.11  
The Treasurer of the Company, G. BARNEWITZ. The President of the Company, A. SICCIONI.

**MINE "EL CALAO,"**  
GUAYANA, VENEZUELA.  
COUPONS OF SHARES ..... 322  
GOLD IN BARS produced in the month of February, 1880, and re- Ozs. submitted to Messrs. Baring Brothers and Co. ..... 4098.62  
Dividend distributed in the month for each coupon ..... \$100  
The Treasurer, G. BARNEWITZ. The President of the Company, A. SICCIONI.

**THE LINARES LEAD MINING COMPANY (LIMITED).**

Notice is hereby given, that the HALF-YEARLY GENERAL MEETING of the Shareholders of this company will be HELD at this office on THURSDAY, the 8th April next, at One o'clock P.M.

To receive the accounts, balance-sheet, and reports of the directors, auditors, superintendents, and mining agents for the half-year ending the 31st December, 1879.

To elect two directors in the place of John R. Peill and Frederick W. Bigge, Esqs., who go out of office by rotation. They are both eligible, and offer themselves for re-election.

To appoint two auditors for the ensuing year. Edward L. Agar and William Carter, Esq., who are eligible, offer themselves for re-election.

And for general business, as authorised by the Deed of Settlement.

By order of the Board, H. SWAFFIELD, Secretary.

5, Queen-street-place, Upper Thames-street, London, E.C.

31st March, 1880.

**THE ALAMILLOS COMPANY (LIMITED).**

Notice is hereby given, that the HALF-YEARLY GENERAL MEETING of the shareholders in this company will be HELD at this office, on THURSDAY, the 8th April next, at a quarter to Two o'clock p.m.

To receive the accounts and balance-sheet, with reports from the directors, auditors, superintendents, and mining agents, for the half-year ending 31st Dec., 1879.

To elect two directors in the place of William Cox and Robert Henty, Esqs., who go out of office by rotation. They are both eligible, and offer themselves for re-election.

To appoint two auditors for the ensuing year. Edward J. St. John and William Carter, Esq., who are eligible, offer themselves for re-election.

And for general business, as authorised by the Articles of Association.

By order of the Board, H. SWAFFIELD, Secretary.

5, Queen-street-place, Upper Thames-street, London, 31st March, 1880.

**THE FORTUNA COMPANY (LIMITED).**

Notice is hereby given, that the HALF-YEARLY GENERAL MEETING of the Shareholders in this Company will be HELD at this Office, on THURSDAY, the 8th April next, at a quarter past Two o'clock, P.M.

To receive the accounts, balance-sheet, and reports of the directors, auditors, superintendent, and mining agents for the half-year ending 31st December, 1879.

To elect two directors in the place of John P. Judd and Frederick W. Bigge, Esqs., who go out of office by rotation. They are both eligible, and offer themselves for re-election.

To appoint two auditors for the ensuing year. E. J. St. John, Esq., and Richard Donagan, Esq., who are eligible, offer themselves for re-election.

And for general business, as authorised by the Deed of Settlement.

By order of the Board, H. SWAFFIELD, Secretary.

5, Queen-street-place, London, 31st March, 1880.

**ROMAN GRAVELS MINING COMPANY (LIMITED).**

Notice is hereby given, that the Directors have THIS DAY DECLARED a DIVIDEND of £3000 (free of income tax), being FIVE SHILLINGS PER SHARE on the 12,000 Shares of the company, PAYABLE on and after WEDNESDAY, the 21st proximo, to the Shareholders now on the Register.

By Order, F. F. WILSON, Secretary.

30, Finsbury-circus, London, E.C., 31st March, 1880.

**WEST WHEAL TOWAN (COPPER AND TIN)—EAST ELIZA (COPPER AND TIN)—NEW COMB MARTIN (SILVER-LEAD).**

I beg to refer your readers to my letter in this day's Journal, page 389, in respect to the two former. Special reports and exclusive data and intelligence can be had by intending investors on application to me.

New Commartin is proved rich for silver-lead ores—18 ozs. average per ton. The characteristics and lodes are identical with Commartin, and doubtless will prove equally profitable. Capt. John Treweave says No. 3 lode is 20 ft. wide, and equal in promise with old Commartin lode, which he has seen yielding £400 to the fathom. Mr. William Newton has assayed ores yielding 1000 ozs. silver to the ton, and other experts are sanguine of success and rapidly expanding yield.

Early application for shares is requested by R. TREDINICK, Consulting Engineer, 6, Mildmay Chambers, 82, Bishopsgate-street, London, E.C.

**NICKEL AND COBALT REFINING, AND GERMAN SILVER WORKS, 15, OOZELL STREET, NORTH, BIRMINGHAM.**

STEPHEN BARKER begs to inform the Trade that he has the following articles for sale:

REFINED METALLIC NICKEL.  
REFINED METALLIC BISMUTH.  
OXIDE OF COBALT.  
GERMAN SILVER—IN INGOTS, SHEET, WIRE, &c.  
NICKEL AND COBALT ORES PURCHASED.

**GOLDENHILL COBALT, NICKEL, COLOUR, BORAX, AND CHEMICAL WORKS,**  
NEAR STOKE-UPON-TRENT, STAFFORDSHIRE.

JOHN HENSHALL WILLIAMSON, MANUFACTURER AND REFINER.

Purchaser of Borate of Lime and Tincal

**CLERICAL, MEDICAL, AND GENERAL LIFE ASSURANCE SOCIETY.**

13, St. James's Square, London, S.W.

City Branch: Mansion House Buildings, E.C.

**DISTINCTIVE FEATURES.**

CREDIT of half the first five Annual Premiums allowed on whole-term Policies on healthy Lives not over 60 years of age.

ENDOWMENT ASSURANCES granted, without Profits, payable at death or on attaining a specified age.

INVALID LIVES assured at rates proportioned to the risk.

CLAIMS paid thirty days after proof of death.

**BONUS.**

The Reversionary Bonus at the Quinquennial Division in January, 1877 amounting to £357,014, averaged 50 per Cent., and the Cash Bonus 30 per cent., on the Premiums paid in the five years.

The Next Division of Profits will take place in January, 1882, and Persons who effect New Policies before the end of June next will be entitled at that Division to one year's additional share of Profits over late Entrants.

**REPORT, 1870.**

The 55th Annual Report, and the latest Balance Sheets rendered to the Board of Trade can be obtained at either of the Society's Offices, or any of its Agents.

GEORGE CUTLIFFE, ACTUARY AND SECRETARY.

**J. S. MERRY,**  
ASSAYER AND ANALYTICAL CHEMIST  
SWANSEA

SUPPLIES ASSAY OFFICE REQUIREMENTS AND RE-AGENTS.

**THE BIRMINGHAM RAILWAY CARRIAGE AND WAGON COMPANY**

(LIMITED)

MANUFACTURE RAILWAY CARRIAGES AND WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by IMMEDIATE or DEFERRED PAYMENTS. They have also WAGONS FOR HIRE capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract.

MANUFACTURERS also of IRONWORK, WHEELS, and AXLES.

EDMUND FOWLER, Managing Director.

WORKS—SMETHWICK, BIRMINGHAM.

TO MINERS IN NORTH AMERICA.

**CHEMICAL LABORATORY AND GENERAL MINING OFFICES.**

J. S. PHILLIPS, M.E.,

702, CALIFORNIA STREET, SAN FRANCISCO

EXAMINER OF MINES, MINERAL ASSAYER, &c.

Practical Instructions for Testing and Assaying, by Blowpipe, Chemicals, Crucible Scorifier, &c.

Author of the "Explorers', Miners', and Metallurgists' Companion," a practical work of 672 pages, with 81 illustrations. Price, second edition, \$10.50.

Inventor of the "WEE PET" Assaying Machine, which obtained a GOLD MEDAL at the San Francisco Mechanics Institute Fair of 1869. Price \$100.

Having had Thirty Years' experience (twenty in Cornwall and ten in U.S., America), offers his services to those requiring ADVICE on MINES or MINING, ENGINEERING, ASSAYING, SMELTING, MILLING, and CHEMICAL REDUCTION.

REFERENCES.

In England—The London Mining Journal, and leading Cornishmen.

In California—The Mining and Scientific Press, and principal Miners.

### EXETER BISHOPRIC ESTATES.

CARGOOL MANOR.

THE ECCLESIASTICAL COMMISSIONERS FOR ENGLAND are in a position to GRANT LEASES to RESPONSIBLE PARTIES for the WORKING OF MINES in certain lands forming part of CARGOOL COMMON, and bounded on the north-east by the ESTATE called "TRELUDRA," and by the road leading from ZELAH to NEWLYN EAST.

The Mines that have been worked in the district have been very rich for lead, and South Shepherds Mine, which is situated in the above-named lands, and which was worked down to the year 1834, is reported to be a very valuable one.

Applications may be made to—

Messrs. CLUTTON, 9, Whitehall-place, London, S.W. ;

Or to their Local Agent,—

Capt. JOSIAH THOMAS, Tregenna Villas, Camborne.

IN LIQUIDATION.

**FORCE CRAGG LEAD AND BARYTES MINE AND WORKS.**

SITUATE AT BRAITHWAITE, NEAR KESWICK, IN THE COUNTY OF CUMBERLAND, FOR SALE.

TENDERERS will be received by the UNDERSIGNED, on or before

the 26th day of April, 1880, stating the HIGHEST PRICE which will be given for the above VALUABLE MINE and WORKS, now in full working order.

The set is a very large one, and contains veins of COBALT, MANGANESE, LEAD ORE, and BARYTES. A tramway runs through the set, and there are two mills driven by water power for grinding barytes, plant for bleaching barytes; set of stamps and water-wheel for crushing lead ore. Royalty very low, and dead rent only £25 a year, merging into royalty.

T. Richards, Esq., F.G.S., Bond-street, Redruth, inspected the property recently, and his report, with any further information required, can be had on application to Mr. JOHN PEARSON, Accountant, Cockerham, one of the Liquidators,

Cockerham, March 8, 1880.

CORNWALL, NEAR ST. AUSTELL.

**THE ROCHE FELS PAR WORKS,**

As a Going Concern.

THE VALUABLE LEASE, together with the PLANT and STORES.

**MESSRS. MARSH, MILNER, AND CO. WILL SELL, BY AUCTION,**

at the Mart, in the City of London, on Thursday, April 15, at two o'clock, in One Lot, the VALUABLE LEASE of the above, held for about

twelve years at £15 per annum (merging in royalty). There are good road approaches, and railway accommodation near.

Particulars of Messrs. E. and E. LEADHAM HOUGH, Solicitors, Carlisle : Messrs. HOLMES, SPENCE, and Co., Accountants, 10, Royal Arcade, Newcastle-upon-Tyne ; and at 54, Cannon-street.

**TO BE SOLD BY PUBLIC AUCTION,**

under Decree of the Supreme Court of Newfoundland in Equity, in a suit between CHARLES FOX BENNETT, Plaintiff, and SMITH, MCKAY, and LEANDER GILL, Defendants, on Thursday, the 1st day of July next, at Twelve o'clock noon (if not previously disposed of by private sale), at the Court House, St. John's, Newfoundland, that VALUABLE COPPER MINE and MINING PROPERTY called and known as the

UNION MINE,

Situate on the east and west sides of Tilt Cove, on the north side of Notre Dame or Green Bay, Newfoundland, and near Cape John, with all erections, improvements, plant, and other property and effects thereto appertaining.

The Mine is held under Grant in fee from the Government of Newfoundland, containing two miles in length by half a mile in breadth ; a License of Occupation from the said Government containing one mile square west of and adjoining the Crown Grant, and land held under conveyance of fees simple interest of former owners.

The title-deeds and documents, plans and surveys and Conditions of Sale of the property may be seen, and further information may be obtained, by application to PRESCOTT EMERSON, Esq., Q.C., Master in Chancery, at his office, in St. John's, or to either of the undersigned solicitors for the parties, or to either of

PRESCOTT EMERSON, Q.C.,

Master in Chancery, St. John's, Newfoundland.

January 23rd, 1880.

For further particulars apply to C. T. BENNETT, Esq., 55, Queen's-square, Bristol ; Messrs. HENRY BATH and Son, Gresham House, London, or to PINSENT and GREENE, Solicitors for the Plaintiff ; WINTER and CARTER, Solicitors for Defendant, MCKAY.

IN VOLUNTARY LIQUIDATION UNDER THE COMPANIES ACT, 1862.

**THE NEW LLANGYNOG LEAD MINING COMPANY (LIMITED).**

**TO BE SOLD, BY PRIVATE TREATY, ALL the BENEFICIAL INTEREST of the New Llangynog Lead Mining Company (Limited) in the Llangynog Lead Mines, comprising all the valuable, productive, and extensive mines, veins, beds of lead, ore of lead, and other metals and minerals known collectively as the Llangynog Lead Mines, and in the reservoir, water-supply rights, easements, and interests thereto belonging, situate in the several parishes of Llangynog, Llanrhaid-yn-Mochant, Hirnant, and Pennant, in the county of Montgomery ; and also the WHOLE of the movable PLANT and MACHINERY of the said company.**

The Llangynog Lead Mines have been a highly productive and dividend-paying property.

The mines, machinery, and plant are in working order, and considerable quantities of ore are now being raised.

The works may be inspected at any time upon application to the Manager at the Mines. The leases and agreements may be inspected at the offices of Messrs. LONGEVILLE, JONES, and WILLIAMS.

All further information may be obtained, and maps of the property inspected, on application to Messrs. GEO. HASWELL and Sons, 84, Foregate-street, Chester, to HENRY DENNIS, Esq., Mining Engineer, Hafod-y-Bwch, Ruabon ; or to Messrs. LONGEVILLE, JONES, and WILLIAMS, Solicitors, Oswestry.

**BURLEIGH ROCK-DRILLING MACHINERY FOR SALE.**

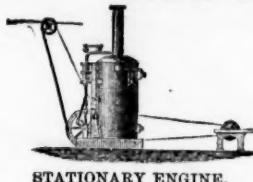
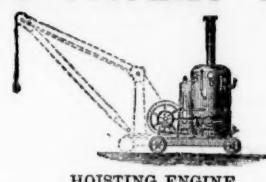
THREE A size ROCK-DRILLING MACHINES. Will drill in hard rock up to 1½ in. diameter.

ONE B size. Will drill up to 2 in. diameter in hard rock.

TWO C size. Will drill up to 3 in. diameter in hard rock.

ONE D size. Will drill up to 4 in

## CHAPLIN'S PATENT PORTABLE STEAM ENGINES AND BOILERS.

STATIONARY ENGINE.  
No Building required.HOISTING ENGINE.  
With or without Jib.\*STEAM CRANE.  
For Wharf or Rail.CONTRACTORS'  
LOCOMOTIVE.SHIPS' ENGINE  
AND DISTILLER.PUMPING AND  
WINDING ENGINE.

\* These Cranes were selected by H.M. Commissioners to receive and send away the Heavy Machinery in the International Exhibitions 1862, 1871, and 1872. The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. ALEX. CHAPLIN, specially designed and adapted for PUMPING, WINDING, HOISTING, SAWING, DRIVING MACHINERY, and for GENERAL CONTRACTORS' WORK, RAILWAY SIDINGS, COAL MINES, QUARRIES, GAS WORKS, &c.

WIMSHURST, HOLICK, & CO., ENGINEERS, 2, WALBROOK, LONDON, E.C.  
WORKS:—REGENT'S CANAL DOCK, 602, COMMERCIAL ROAD EAST, LONDON, E. (Near Stepney Station.) (2)



PARIS, BRONZ MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH, SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

## THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24-90, 27-60, 24-80, 26-10, 28-30, 27-10, 28-40, 28-70 metres. Total advance of south heading during January was 121-30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere ( $\frac{1}{2}$  lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL; and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL, IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

### McKEAN AND CO.

ENGINEERS  
OFFICES,

5, RUE SCRIBE, PARIS

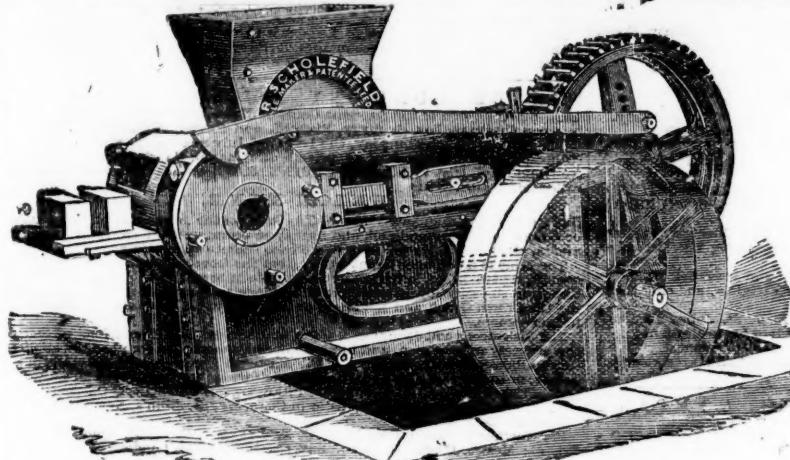
MANUFACTURED FOR MCKEAN AND CO. BY  
MESSRS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"  
GLASGOW.

TO PARENTS AND GUARDIANS.

AN ELIGIBLE OPPORTUNITY is now offered for the SETTLEMENT of an ACTIVE YOUNG GENTLEMAN IN CANADA. He will be enabled to obtain his profession as a Solicitor in five, or if he be a Graduate in three years. Cost of living about £150. In the meantime he will have active work, and obtain a knowledge of the Dominion, which is destined to be one of the most prosperous of the Colonies. Premium, £100 sterling.

HERBERT C. JONES,  
Canada Land and Loan Agency.

## R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:

2 men digging, each 4s. per day	... 8 0
1 man grinding, 4s. 6d. per day	... 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	... 2 0
1 boy greasing, 1s. 6d. per day	... 1 6
1 engine-man, 5s. per day	... 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	... 4 0

Total cost of making 10,000 pressed bricks ... £1 5 0, or 2s. 6d. per 1000.

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.  
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.  
SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS  
KIRKSTAL ROAD LEEDS.

## Electric-Bell Signals for Collieries, Factories, Warehouses, &c.,

WITH OR WITHOUT GALVANIC BATTERIES.

NEW SYSTEM—CAN BE RUNG AT ANY PART OF THE ROAD. Cheap, safe, and reliable. Efficiency guaranteed. LINES OF TELEGRAPH erected and maintained. LIGHTNING CONDUCTORS, &c. For estimates and particulars apply to—

SYDNEY F. WALKER,

LATE G. E. SMITH,

TELEGRAPH ENGINEER:

COMMERCIAL BUILDINGS LONG ROW NOTTINGHAM.

## INCREASED VALUE OF WATER-POWER.

### MacADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to—

MacADAM BROTHERS AND CO., BELFAST.

## JOHN WILLIAMS AND CO., WISHAW, SCOTLAND,

MANUFACTURERS OF ALL KINDS OF

Cut and Lath Nails; Joiners', Moulders', and Flooring Brads; Copper and Zinc Cut Nails; Colliery Plate Nails; Washers, Boiler Plates, Tube Strips, Sheet Iron for Galvanising and other purposes.

PRICE LIST ON APPLICATION.

MR. WILLIAM BREDEMAYER, MINING, CONSULTING  
AND CIVIL ENGINEER, U.S. MINERAL SURVEYOR for UTAH and  
IDAHO. NOTARY PUBLIC.

Geological examinations; reports on mining properties; surveys mines, railroads, and canals, and superintends the workings of the same; prepares estimates and plans for opening and working mines. Expert on mining questions before the Courts.

Address, P.O. Box 1157, Salt Lake City, Utah.

Just published, cloth limp, price 1s. 6d.  
THE COLLIERY READY-RECKONER AND WAGES  
CALCULATOR.

By JAMES IRELAND.

"Will be the means of preventing many disputes between pay clerks and colliers."—Mining Journal.

To be had on application at the MINING JOURNAL OFFICE, 26, Fleet-street, E.C.

# NOBEL'S DYNAMITE

MANUFACTURED AND SOLD BY

NOBEL'S EXPLOSIVES COMPANY (LIMITED), 149, West George Street, Glasgow.

Supplies may be obtained from any of the following Agents of the Company in Great Britain:—

HENRY KITCHIN and Co., 46, New Lowther-street, Whitehaven.  
 F. H. EDWARDS, Fort House, Newcastle-on-Tyne.  
 I'ANSON, ARMSTRONG, and Co., Middlebrough-on-Tees.  
 ALBERT RICKETTS, Dean-lane, Bedminster, Bristol.  
 B. READ, Reforme, Portland, Dorsetshire.  
 LEIGH and SILLAVAN, Barton House, 66, Deansgate, Manchester.  
 GEORGE ROBERTS, George-street, Gloucester.  
 J. H. BEAN and Co., 6 Albion-street, Leeds.  
 WM. RICH and Sons, 4, Basset-street, Redruth, Cornwall.  
 CROSS BROTHERS, 21, Working-street, Cardiff.  
 G. WILLIAMS, 6 and 7, Baker-street, Aberystwith.  
 WEBB and Co., Llanberis, Caernarvon.

J. T. EACHUS, Holywell.  
 JOHNSON and Co., Tower-street, Dudley.  
 TODHUNTER and ELLIOT, Market-place, Douglas, Isle of Man.  
 ROBERT HAMILTON, 29, St. James's-square, Edinburgh.  
 JOHN DONALD, 4, Belmont-street, Aberdeen.  
 WILLIAM WATSON, Sunnyside-road, Coatbridge.  
 ROBERT HAMILTON, Douglas-street, Dunfermline.  
 JOHN D. M'JANNET, Park-place, Sterling.  
 CHARLES CUNNINGHAM, 82, Commercial-street, Dundee.  
 R. and J. CARSON, 8 and 10, Corn Market, Belfast.  
 CLOHERY and SEMPLE, Merchants' Road, Galway.  
 COOKE BROTHERS, 67, Patrick-street, Cork.

LONDON AND EXPORT AGENTS:

J. and G. THORNE and Co., 85, GRACECHURCH STREET, LONDON, E.C.  
 FACTORIES—ARDEER WORKS, STEVENSTON, AYRSHIRE.  
 WESTQUARTER WORKS, POLMONT STATION, STIRLINGSHIRE.

## TONITE, OR COTTON POWDER. THE SAFEST, CHEAPEST, AND STRONGEST OF ALL EXPLOSIVES.

RECOMMENDED TO MINERS, PIT SINKERS, QUARRYMEN AND CONTRACTORS  
AS THE MOST EFFICIENT AND ECONOMICAL BLASTING AGENT EVER INVENTED.

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Agents: DINEEN, SON, and Co., Leeds; DAVID BURNS, Haltwhistle; R. J. CUNNACK, Helston, Cornwall; J. and W. SMITH, Chapel-en-le-Frith; W. VEITCH, Jedburgh, N.B.; W. HARRISON, Barrow-in-Furness.

## PATENT DETONATORS.

### FIRST-CLASS DETONATORS

MANUFACTURED FOR THE TRADE ON  
THE MOST FAVOURABLE TERMS.

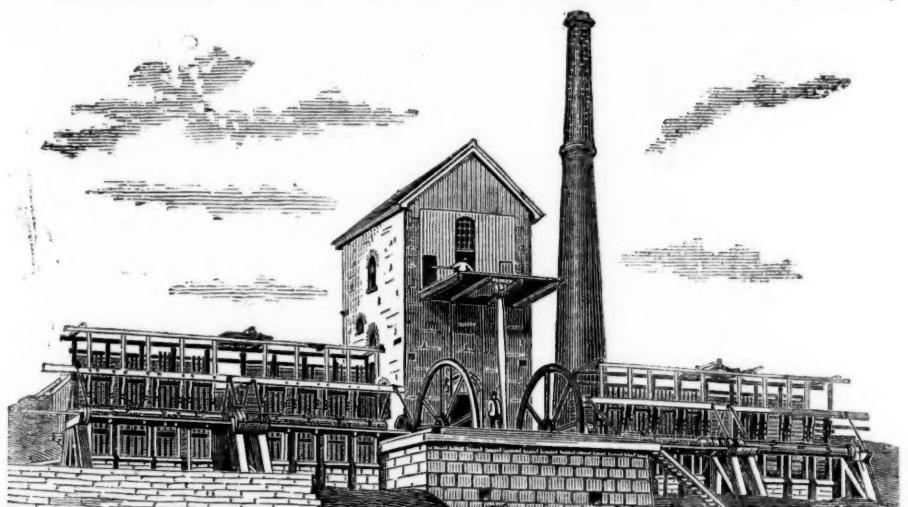
The COTTON POWDER COMPANY (Limited), 23, Queen Anne's Gate, London, S.W.

ROCK DRILLS, AND DIAMOND BORING MACHINERY.  
 AIR COMPRESSORS, SINKING AND DRIVING APPARATUS.  
 ELECTRIC FUSES, BORNHARDT'S & BRAIN'S FIRING MACHINES.  
 Electric Cables, Dynamo Machines, Motors, and Transfer Power  
Apparatus. Mining and Ore Dressing Machinery.

JOHN DARLINGTON, 2, COLEMAN STREET BUILDINGS,  
MOORGATE STREET, LONDON.

## THE TUCKINGMILL FOUNDRY COMPANY,

TUCKINGMILL FOUNDRY AND ROSEWORTHY HAMMER MILLS,

CAMBORNE, CORNWALL,  
Engineers, Iron and Brass Founders, &c.,

REGISTERED TRADE MARK.

MANUFACTURERS OF EVERY DESCRIPTION OF

REGISTERED TRADE MARK.

T. F. PUMPING, WINDING, AND STAMPING ENGINES  
ALL KINDS OF  
MINING MACHINERY, SHOVELS, AND  
MINERS' TOOLS;

ALSO OF

BLAKE'S STONE BREAKERS.

ESTIMATES GIVEN UPON INDENTS AND SPECIFICATIONS.  
ILLUSTRATED CATALOGUES POST FREE ON APPLICATION.

LONDON OFFICE: 85, GRACECHURCH STREET, E.C.



## MANCHESTER WIRE WORKS.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

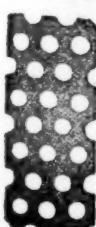
JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

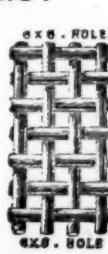
LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES

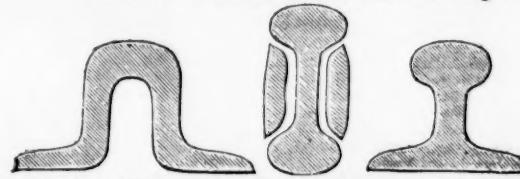


Shipping Orders Executed with the Greatest Dispatch.



## JOHN BEATSON AND SON,

40h, St. Mary's Gate, Derby.



IRON AND STEEL RAILS, of all sections, from 10 to 86 lbs. per yard, new perfect, new slightly defective, or second hand, with Fish-plates and Nuts, Chairs, Spikes, and Points and Crossings to match, when required.

STEEL AND IRON WIRE ROPES, LOCOMOTIVE ENGINES, &amp;c., &amp;c.

STEEL OF ALL KINDS. PIG IRON OF ALL KINDS

Delivered at all Railway Stations and Ports in Great Britain

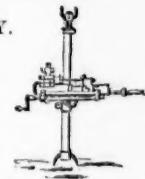
## DUNN'S IMPROVED ROCK DRILL.

This DRILL is of GREAT  
STRENGTH and SIMPLICITY.  
SECOND TO NONE IN THE  
KINGDOM.We are prepared to SUPPLY  
our well known MACHINES at  
greatly REDUCED PRICES—  
from £35, according to calibre  
of cylinder

ESTIMATES GIVEN FOR PLANTS, &amp;c., &amp;c.

Dunn's Patent Rock Drill Company

(LIMITED),

OFFICE, 193, GOSWELL ROAD,  
LONDON, E.C.

## CRAVEN AND SPEEDING BROS.,

MANUFACTURERS OF EVERY DESCRIPTION OF

### WIRE AND HEMP ROPES

FOR  
COLLIERIES, RAILWAYS AND SHIPPING, &c.

Charcoal and Steel Wire Ropes (Flat and Round), of best selected Charcoal and Steel Wire.

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## THE MINING SHARE LIST.

## BRITISH DIVIDEND MINES.

Shares.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
100000 Caron, <i>t</i> , Cardigan*.....	2 0 0 .....	2 1/4	1 1/2	0 4 0 .....	0 2 .....	Oct. 1878
100000 Carn Brea, <i>c</i> , Illogan*.....	56 7 6 .....	60 .....	65 90 .....	308 0 .....	1 0 .....	Feb. 1874
10240 Devon Gt. Consols, <i>c</i> , <i>a</i> , Tavistock*†	1 0 .....	0 13 .....	12 1/4	12 1/4 .....	117 3 0 .....	Feb. 1880
4296 Dolcoath, <i>c</i> , <i>t</i> , Camborne.....	10 14 10 .....	56 .....	57 10 .....	60 .....	115 1 3 .....	Jan. 1880
6400 East Pool, <i>t</i> , Illogan.....	0 9 9 .....	30 .....	34 36 .....	18 15 3 .....	1 2 6 .....	Mar. 1880
40000 Glasg. Car., <i>c</i> * [30000 sh. £1 pd.], 10000 15s. pd.].....	1 1/4 .....	1 1/2	1 1/4 .....	0 13 10 .....	0 0 .....	Aug. 1878
8500 Gorseid and Merlin Con., <i>c</i> , Flint.....	2 10 .....	2 1/2 .....	2 1/2 .....	0 5 0 .....	0 5 .....	Aug. 1877
15000 Great Laxey, <i>t</i> , Isle of Man*.....	4 0 .....	18 2 .....	18 19 .....	25 6 .....	0 0 .....	Jan. 1880
6400 Great Hurth, <i>t</i> , Durham*.....	0 6 8 .....	8 .....	7 1/2 8 .....	2 10 .....	0 5 0 .....	Mar. 1880
20000 Grogwinion, <i>t</i> , Cardigan*.....	2 0 .....	4 .....	3 1/2 4 .....	0 14 10 .....	0 1 .....	Aug. 1878
2800 Isle of Man, <i>t</i> , Isle of Man*.....	25 0 .....	— .....	— .....	82 5 0 .....	0 10 .....	Feb. 1879
20000 Lerdhills, <i>s</i> , Lanarkshire.....	6 0 .....	3 1/4 .....	3 1/4 3/4 .....	0 15 0 .....	0 3 .....	Mar. 1878
4000 Lelshur, <i>s</i> , Cardiganshire.....	18 15 0 .....	35 .....	30 35 .....	600 10 .....	1 0 .....	Mar. 1880
10000 Meuanear, <i>c</i> , Hayle*.....	2 0 .....	5 1/2 .....	5 1/2 .....	0 14 0 .....	0 4 .....	Jan. 1880
9000 Minera Mining Co., <i>t</i> , Wrexham*.....	5 0 .....	12 .....	10 11 .....	69 2 0 .....	2 0 .....	Feb. 1880
20000 Mining Co. of Ireland, <i>c</i> , <i>t</i> *.....	7 0 .....	3 .....	3 1/2 .....	24 0 .....	0 0 .....	Feb. 1880
5328 North Busy, <i>c</i> , Chacewater.....	0 5 8 .....	1 .....	1 1/4 .....	0 3 4 .....	0 0 .....	Oct. 1878
11829 North Hendre, <i>t</i> , Wales.....	2 10 .....	7 1/2 .....	— .....	3 10 0 .....	0 7 .....	Mar. 1880
8063 Ditto.....	1 0 .....	4 .....	— .....	0 7 .....	0 3 .....	Mar. 1880
6000 Pennant, <i>t</i> , Llanrhystud, North Wales*.....	5 0 .....	3 1/4 .....	2 1/2 3/4 .....	0 10 0 .....	0 5 0 .....	Mar. 1878
12000 Phoenix United, <i>t</i> , <i>c</i> , Linkt.....	5 10 3 .....	5 1/2 .....	5 1/2 .....	0 2 6 .....	0 2 .....	Mar. 1880
18000 Pr. Patrick, <i>s</i> , <i>t</i> , (als. 120000 pd. 10 p.c.).....	1 0 .....	3 .....	2 1/2 3 .....	0 15 6 .....	0 1 .....	Dec. 1879
10000 Red Rock, <i>t</i> , Cardigan*.....	2 0 .....	2 1/4 .....	1 1/4 .....	0 4 0 .....	0 2 .....	Jan. 1880
12000 Roman Gravels, <i>t</i> , Salop*.....	7 10 .....	10 1/2 .....	10 1/2 10 1/2 .....	8 1 0 .....	0 5 0 .....	Apr. 1880
4000 Rhyladun, <i>t</i> , Wales.....	10 0 .....	10 .....	— .....	0 5 0 .....	0 5 .....	Feb. 1880
512 South Cardigan, <i>c</i> , St. Cleer*.....	1 5 0 .....	130 .....	140 .....	746 0 .....	1 0 10 .....	Jan. 1880
6123 South Conduor, <i>c</i> , Cambernet*.....	6 5 6 .....	11 1/2 .....	11 12 .....	5 12 0 .....	0 15 0 .....	Jan. 1880
9000 South Darren, <i>t</i> , Cardigan*.....	1 10 0 .....	3 1/2 3 .....	3 1/2 3 .....	0 2 0 .....	0 2 .....	Jan. 1880
4500 South West Frances, <i>t</i> , Illogan*.....	7 12 .....	16 10 .....	16 17 .....	45 6 0 .....	0 16 0 .....	Mar. 1880
12000 Tankerville, <i>t</i> , Salop*†.....	6 0 .....	5 .....	4 1/2 5 .....	4 17 6 .....	0 5 0 .....	Jan. 1877
6000 Tincroft, <i>c</i> , Pool, Illogan*.....	11 10 .....	17 1/2 .....	18 1/2 19 1/2 .....	50 8 0 .....	6 0 .....	May 1877
15000 Van, <i>t</i> , Llanidloes*.....	4 5 0 .....	18 1/2 .....	17 19 .....	24 10 6 .....	0 10 0 .....	Jan. 1880
3000 West Chiverton, <i>t</i> , Perranzabuloe*.....	19 15 0 .....	11 .....	11 1/2 .....	55 10 0 .....	0 10 0 .....	Feb. 1878
512 West Tolgus, <i>c</i> , Redruth.....	95 10 0 .....	55 .....	55 10 .....	33 0 0 .....	0 1 0 .....	Jan. 1879
12000 West Wheal Seton, <i>c</i> , Camborne*.....	51 0 .....	25 .....	23 25 .....	446 0 .....	0 15 0 .....	Apr. 1878
12000 Wheal Crebior, <i>c</i> , Tavistock.....	2 4 0 .....	4 1/2 .....	4 1/2 4 1/2 .....	0 3 9 0 .....	0 3 9 .....	Mar. 1880
1024 Wheal Eliza Consols, <i>t</i> , St. Austell*.....	18 0 .....	— .....	— .....	30 10 0 .....	0 3 0 .....	Feb. 1880
4295 Wheal Kitty, <i>t</i> , St. Agnes.....	5 4 6 .....	5 .....	5 1/2 5 .....	12 9 6 .....	0 10 0 .....	Jan. 1880
3000 Wheal Peveril, <i>t</i> , Redruth.....	7 11 0 .....	27 .....	27 23 .....	4 1 0 .....	1 12 6 .....	Feb. 1880

## FOREIGN DIVIDEND MINES.

Shares.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
35500 Alamillos, <i>t</i> , Spain*†.....	2 0 0 .....	1 1/4 .....	1 1/2 .....	2 0 9 .....	0 1 0 .....	Apr. 1880
30000 Almada and Trito Consol., <i>s</i> *†.....	1 0 0 .....	3 1/4 .....	3 1/2 5 .....	0 6 3 .....	0 1 0 .....	May 1876
20000 Australian, <i>c</i> , South Australia*.....	7 7 6 .....	2 .....	1 1/2 2 .....	1 3 6 .....	0 2 0 .....	Aug. 1879
20000 Cape Copper Mining, <i>s</i> , South Africa*.....	7 0 .....	0 .....	39 10 .....	38 40 .....	0 7 7 .....	Mar. 1880
35000 Cesene Sulph. Co., Romagna, Italy*.....	10 0 .....	0 .....	— .....	1 1 .....	0 1 0 .....	Aug. 1879
10000 Copiapo, <i>c</i> , Chile* [£20 shares].....	17 0 .....	0 .....	12 12 .....	12 13 .....	7 11 5 .....	Mar. 1877
23500 Eberhardt and Aurora, <i>s</i> , Nevada*†.....	10 0 .....	4 1/2 .....	3 1/2 4 1/2 .....	1 8 0 .....	0 3 0 .....	Dec. 1877
70000 English & Australian, <i>s</i> , C. Aust.*.....	2 10 0 .....	1 1/4 .....	1 1/2 1 1/4 .....	2 18 9 .....	9 0 1 .....	Mar. 1880
25000 Fortuna, <i>t</i> , Spain*†.....	2 0 0 .....	5 1/4 .....	5 1/2 .....	7 11 5 .....	0 5 0 .....	Apr. 1880
55000 Frontino, <i>s</i> , Bolivia, New Gran.*†.....	2 0 0 .....	3 1/2 .....	3 1/2 3 .....	0 3 6 .....	0 1 0 .....	Feb. 1879
15000 Linares, <i>t</i> , Spain*†.....	3 0 0 .....	6 1/2 .....	5 1/2 6 .....	18 10 0 .....	8 0 8 .....	Apr. 1880
10000 Pontigaud, <i>s</i> , France*.....	20 0 .....	0 .....	23 .....	21 23 .....	6 0 10 .....	Dec. 1879
100000 Port Phillip, <i>s</i> , Clunes*† [£2 shares].....	1 0 0 .....	3/8 .....	3/8 5/8 .....	1 12 0 .....	0 1 0 .....	Mar. 1879
54000 Richmond Consol., <i>s</i> , Nevada*†.....	5 0 0 .....	13 1/4 .....	13 1/4 14 1/4 .....	8 4 6 .....	0 7 6 .....	Feb. 1880
40000 Santa Barbara, <i>s</i> , Brazil.....	0 10 0 .....	25 .....	25 21/2 .....	0 8 9 .....	0 1 6 .....	Nov. 1879
12000 Scottish-Australian Mining Co.*†.....	1 0 0 .....	2 1/2 .....	1 1/2 2 1/2 .....	15 10 .....	0 1 0 .....	Nov. 1879
80000 Ditto.....	9 10 0 .....	1/2 .....	1 1/2 .....	15 10 .....	0 1 0 .....	Feb. 1879
25000 Fortuna, <i>t</i> , Spain*†.....	2 0 0 .....	5 1/2 .....	5 1/2 .....	1 1/2 1 1/2 .....	0 1 0 .....	Feb. 1880
15000 Gruyere, <i>s</i> , Arèges, France.....	12 000 .....	0 .....	0 .....	0 2 0 .....	0 2 0 .....	Jan. 1880
22500 Hornbach, <i>s</i> , Utah*.....	5 0 0 .....	25 .....	25 .....	20 8 0 .....	0 1 6 .....	Apr. 1879
4625 Ditto, Plumas Eureka*.....	2 0 0 .....	3 1/2 .....	3 1/2 3 .....	2 7 0 .....	0 3 0 .....	Oct. 1879
253000 St. John del Rey*† [£5 Stock and multiples dealt in].....	245 255 .....	— .....	— .....	12 1/2 .....	0 .....	for half-year, June 1879
20000 Tolima, <i>s</i> , Colombia.....	5 0 0 .....	— .....	— .....	1 3 0 .....	0 4 0 .....	Mar. 1880
25000 Victoria* (London), <i>s</i> , Australia*.....	1 0 0 .....	— .....	— .....	0 13 1/2 0 .....	0 7 0 1/2 .....	July 1879
2100 W. Prussian (5500 pd. sh. £10 pd.).....	10 0 .....	10 1/2 .....	10 10 1/2 .....	2 10 0 .....	0 8 0 .....	Apr. 1880

§ Have made calls since last dividend was paid.

## NON-DIVIDEND BRITISH MINES.

Shares.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
25600 Aberllyn, <i>s</i> , <i>t</i> , Carnarvon.....	1 0 0 .....	0 .....	1 1/4 .....	0 1 0 .....	1 1/4 .....	Oct. 1878
12000 Asheton, <i>t</i> , Carnarvonshire*.....	5 0 0 .....	1 .....	1 1/2 .....	0 1 0 .....	1 1/2 .....	Feb. 1878
11583 Bedford Unit., <i>c</i> , Tavis [£1 libab.].....	0 4 0 .....	0 .....	1 .....	3 0 0 .....	3 .....	Feb. 1880
30000 Bettws-y-Coed, <i>t</i> [20000 sh. issued].....	1 0 0 .....	0 .....	— .....	— .....	— .....	Feb. 1880
8000 Blaen Caelan, <i>s</i> , <i>t</i> , Cardigan.....	3 0 0 .....	0 .....	3 .....	4 6 6 .....	4 .....	Aug. 1878
3339 Blue Hills, <i>t</i> , <i>c</i> , St. Agnes.....	4 6 6 ..					